ENVIRONMENTAL ASSESSMENT BOARD

Ontario

ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

VOLUME: 65

DATE: Thursday, September 26, 1991

BEFORE:

HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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ENVIRONMENTAL ASSESSMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act, R.S.O. 1980, c. 140, as amended, and Regulations thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro consisting of a program in respect of activities associated with meeting future electricity requirements in Ontario.

Held on the 5th Floor, 2200 Yonge Street, Toronto, Ontario, on Thursday, the 26th day of September, 1991, commencing at 10:00 a.m.

VOLUME 65

B E F O R E :

THE HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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L I S T o f E X H I B I T S

L I S T o f U N D E R T A K I N G S

---Upon commencing at 10:13 a.m.

THE REGISTRAR: Please come to order. This hearing is now in session. Be seated, please.

MR. B. CAMPBELL: Mr. Chairman, we have now provided to my friend, as the panel will be aware, and distributed to those here today, Undertakings 267.23, which is the memorandum with respect to solar water heaters, and Undertaking 267.24, which is the back of the envelope calculation typed up, and I believe everybody has those now. They will be distributed as well in the normal distribution, but they are available now.

THE CHAIRMAN: They don't need to be further identified, I take it. They can be dealt with in cross-examination with reference to those numbers?

MR. B. CAMPBELL: That is correct. I guess I should have not left it quite so much in the vernacular. 267.24 is a comparison of costs and benefits of solar water heating versus water heater tune-up, as I say, I affectionately refer to it as the back of the envelope typed up.

THE CHAIRMAN: Thank you. Mr. Grenville-Wood?

MR. GRENVILLE-WOOD: Thank you, Mr. Chairman. So, these would documents we won't be giving

exhibit numbers, we will just refer to them as responses to the two undertakings will be sufficient, is that right?

THE CHAIRMAN: I think that should be satisfactory. Let me check with Mr. Nunn.

Is that a satisfactory way of doing things?

MR. NUNN: Yes.

MR. GRENVILLE-WOOD: Thank you, Mr. Chairman.

Thank you for your indulgence this morning allowing me, I just received this at 10:00, to review it. On our cursory review, we feel that we do need all little more time to review it. So if we get as far as the break, I will then take that opportunity to review it further in order to see if I wish to conduct further cross-examination on at least one of these documents.

THE CHAIRMAN: All right.

PAUL JONATHAN BURKE,
AMIR SHALABY,
MARION ELIZABETH FRASER,
LYN DOUGLAS WILSON,
WILLIAM OSBORNE HARPER,
IAN DUNCAN MacLELLAN; Resumed.

CROSS-EXAMINATION BY MR. GRENVILLE-WOOD (cont'd):

Q. A couple of questions just flowing

out of yesterday. The response to Undertaking 267.24, my understanding was it was a comparison between the Undertaking 267.23 analysis, and a report contained in the PCRD.

MR. MacLELLAN: A. That's correct.

Q. I know the PCRD is a pretty voluminous document. Just to assist us, I wonder if you could give us a specific reference in that, so that I could easily refer to it and attempt to replicate your calculations?

A. Sure, it is contained in part 1 and part 2. I will give you the part 2 reference. Volume 3, pages 490 and 491. That's where the demand and energy impacts of the water heater tune-up program came from.

THE CHAIRMAN: 290 and 291 did you say?

MR. MacLELLAN: 490 and 491.

MR. GRENVILLE-WOOD: Q. Thank you, very much.

Now, I'm also grateful for the release this morning of the magazine article that Ms. Fraser referred to yesterday. Again, we haven't had a chance to look at it in great detail, but from a cursory look at it, a question arises, and that is, are there any plans within Hydro to replicate this, what you might

call, initiative? And if there are any, what sort of plans are there?

MS. FRASER: A. At this point there are no specific plans. As I indicated yesterday, when we do have an interesting project, such as this one, if it is agreed to by the consulting engineer and the customer, we will develop either a case study, which is used by our field reps in other presentations, or we will develop a case study that is published in what used to be called "Electric Options," is now called "Power Saver Options," which is a newsletter which is distributed to a mailing list of around 5,000 consulting engineers, architects and other people involved in the commercial building sector. But at this time we -- once it is up and running, we have some good staff. That's probably when we would do it.

Q. How long is it before it is up and running?

A. I believe it is expected to be constructed by the end of this year, but I'm not very positive on that. I think completed June 1992 in the article it says.

Q. June 1992 is the completion date. So you'd wait for it to be up and running, and let it run for a period of time, I would assume, before conducting

any kind of an assessment on it.

A. Yes, in a case study, it is very valuable to have operating data as well as construction data.

Q. So we are looking at -- presumably not looking at this thing in serious terms until a year or two from the date of completion.

A. Correct, although the consulting engineer, obviously, will probably -- could be taking that technology and trying to use it elsewhere in his projects, if he's satisfied with the results he's achieved here. Our field staff will know of it generally. They won't have operating data per se to talk about it. But certainly that is one way in which we do field sales, so to speak.

Q. Are you satisfied in your own mind, I mean I understand this is sort of someone has come to you with an idea, and you have responded positively to it. Are you satisfied in your own mind that one assessment will give you a clear and satisfactory picture? In other words assessment of one project on this sort of innovative basis?

A. No, and I think it is something that we could probably do a bit more work on. I have recently, after contacts I have made at the Solar

Energy Society annual meeting this year, I referred the whole issue of solar water heating in the commercial market to our concept screening committee. As yet it hasn't come up before the concept screening committee, but I certainly was quite interested in some of the information that I gathered at that conference.

Q. Just to finish off on this, on this one initiative, I'm very pleased to note you made some useful contacts at the annual meeting. I guess better late than never.

But nevertheless, the point is whether or not some other project, such as the Brampton Hydro one, that Hydro couldn't be out trying to solicit other projects which might be useful in attempting to make a more broadly based assessment of projects like the Brampton Hydro one.

Do you have any plans in that area? In other words, going out and seeing where there might be applicable construction underway in public buildings and so on, where you might try and replicate the concept?

A. At this point we have no specific plans in that regard. But it certainly is something that I think is worth looking into.

Q. All right, thank you.

Now, as I move on to the next point, one thing comes to mind. The case study that you would normally do, your case studies are public documents, are they, or are they internal documents?

A. No, they are public documents and an external mailing list.

Q. So, I would presume that once you do a case study on, this Brampton Hydro initiative, the results of that case study will be made available to --

A. Yes, again, we get the agreement, and actually in terms of writing up the case study, we do it in conjunction with the customer and the consulting engineer, and they get the materials as well.

Q. Thank you. I'd just like to return to the question of the gas switching and fuel switching to gas and ask this question. I'm not sure who will necessarily want to answer it, first of all, we agreed yesterday that it was up to 50 per cent of residences in Ontario don't have access to natural gas in order to be able to switch away.

But with respect to those that do have that access, would you not think that switching from one fuel to one single other fuel would not be putting, to use the vernacular that Mr. Campbell started us on this morning, putting too many eggs in one basket or

putting all your eggs in one basket in terms of the fuel switching option. Are there other possibilities you would be examining in the context of the fuel switching option?

MR. BURKE: A. I think our approach so far is based on choosing the most economic alternative that we are aware of. But as we've indicated, we are still awaiting clear policy direction from the Ontario government. If they wish to diversify energy sources as part of a broader energy strategy, and perhaps pay a premium for doing so, they should inform us before we get too far along the road here.

But they have yet to make absolutely clear the basis on which fuel switching should occur, and I'm sure the opportunity still exists to influence the energy strategy adopted by the province.

Q. Just to take that one step further, in the context of the discussion yesterday, where we were talking about what fuel switching to natural gas had as an impact on greenhouse gases, would it not be in Hydro's broader public policy stature or status to take some initiative in this area?

In other words, you recognize, I think both you and Mr. Shalaby and others, that switching to natural gas does have a greenhouse gas impact. And

there are other technologies that might not have any or very little impact, either on that or on other environmentally sensitive areas. Is it not something that, especially in the context of demand management and fuel switching, useful to ask Hydro to think about other alternatives in this context, and take some initiative with the government policy?

A. I maintain at this point that this is more a matter of government policy. I think it is interesting to note that while the government observed the same thing you have in the preamble to their high conservation scenario, which is before this Board as Exhibit 249, in their scenario itself they did not include solar as one of the means by which they achieved that high conservation scenario.

I don't know whether that was reflecting a policy decision on their part that while solar had very attractive properties from the perspective of environment, its economics were such that they just couldn't recommend it. I don't know how conscious that was, and how integrated a policy choice that was, but the document was addressing CO(2). That was what the staff paper was focused on, and yet solar was not part of the scenario.

[10:25 a.m.]

I think that really this is a matter for the government to give Ontario Hydro guidance about.

Q. Thank you, Mr. Burke. I want it noted for the record that Mr. Burke was the first one to use of the "S" word this morning, so that's very nice of him. Thank you.

In the context of this discussion, can you give me some -- again maybe Ms. Fraser would be the one to address this question, but in your view, what would be, from Hydro's perspective, the advantages of using renewable sources of energy?

MR. SHALABY: A. Advantages of customers using renewable energy?

Q. Good morning, Mr. Shalaby.

That is fine, go right ahead.

A. The question is, what advantages to Hydro?

Q. Yes.

A. We use renewable sources of energy in this discussion I think in two respects. One is to make electricity from renewable sources of energy and the other one is customers using renewable sources of energy to meet their demands directly. I wonder which area is of more interest to you at this stage.

Q. Well, the first one I think we could

explore a little bit.

A. For Hydro using renewable energies, it has the advantages of -- some renewable energies have less impact in terms of air emissions, for example. Certainly the fuel cost is often free or very little. Those are events normally indigenous to Ontario, renewable sources in Ontario such as hydraulic or solar are indigenous to the province. So these are some of the advantages of using renewable energies.

Q. Are there advantages in the context of reliability?

A. It cuts both ways. Some renewable sources are intermittent in their nature, you can't count on them at a specific time. So that degrades from their reliability contribution.

Some others are highly reliability such as hydraulic. The equipment that generates electricity from hydraulic power is very highly reliable because it's not complicated, for example. So there are pros and cons to that.

Q. What about the question of evolving technology. Is that an advantage from Hydro's point of view? The ease of adaptability to evolving technologies.

A. I don't understand that particular

point.

Q. In looking at renewable energy sources, do you think they are more easily adapted to or adaptable to the advance of technology as compared to non-renewable sources?

A. I think there are advances in technology in all sources, in all methods of generation.

Q. I think you have outlined a good list of renewable advantages. What is the policy within Hydro with respect to giving an increasing emphasis to renewable energy sources?

A. It's a preferred source of energy in Hydro's hierarchy or order of picking sources of energy. A renewable source has a preference over an unrenewable source.

Q. That's the 10 per cent premium; is it?

A. We express that preference by giving a 10 per cent premium.

Q. Is that the extent of the preference?

A. It is a big step in expressing that preference. There are other ways as well of expressing that preference.

Q. Could you describe the other ways?

A. Other ways, for example, maintaining, for example, in the hydraulic plan, sites that are even less economic than a 10 per cent preference. We keep them on the back burner because some day the economics may shift.

The research and development and monitoring we do of technologies that are not economic even with the 10 per cent preference, we keep an eye and we do some research and development and contribution, demonstrations. All of that have is an expression of interest and preference for renewable sources.

Q. To come back to an answer I think Mr. Wilson gave yesterday saying that Hydro looks at end use rather than technology in terms of its analysis of options. Is that fair? I presume that was a fair statement. I wouldn't try and put dissent between members of the panel. But is that, from your understanding, a correct analysis?

A. Maybe you want to clarify on that a bit. End use compared to technology, I don't...

Q. Compared to the source of energy. When you are looking at various ways of producing energy, you look at what end use it is supposed to meet rather than examining whether this particular

technology or another will produce the required energy.

MR. MacLELLAN: A. Actually, it was my comment and I was --

Q. Was it? Sorry, I thought it was Mr. Wilson.

A. I was relating it to how we develop our programs. I was saying that instead of looking at a technology and deciding what we can do it, we would look at an end use such at such as water heating and deciding, what are the options for making it more efficient in cost-effective manner.

Q. And that's how we got to your back of the envelope discussion?

A. Yes.

Q. Thank you.

Then going back to you, Mr. Shalaby, in that context, looking at end use.

THE CHAIRMAN: I think you are now into the other branch. This is not decisions are made in how to produce electricity; this is in demand management.

Actually, the questions you have been asking Mr. Shalaby really have very little to do with demand management, but the other questions, the other side of the subject do have something to do with demand

management.

MR. GRENVILLE-WOOD: I am leading into this area with Mr. Shalaby and I am just setting some parameters around the discussion.

Q. The question really comes down to then a couple of issues, and one is, in the context of this whole discussion of renewable energy sources and getting down into looking at end use rather than the technology itself, I understand from the discussion that we had yesterday that the conclusion that you reached was that demand management through technology such as solar was not economically or commercially viable. Is that a fair analysis?

MR. SHALABY: A. The specific question you asked was about domestic solar heating, solar water heating, and that conclusion is correct in that particular instance, yes.

Q. Now, given the difficulties that have been repeated here ad infinitum about the nuclear program at Hydro, would you consider that to be commercially viable?

A. Consider the nuclear program?

Q. The nuclear program to be commercially viable?

A. It is commercially viable, yes.

Q. On what basis is it commercially viable.

MR. B. CAMPBELL: We are going to have, Mr. Chairman, a whole panel, which is Panel 9, that will deal with nuclear issues in depth, and I would suggest and submit that that question is proper for Panel 9. I expect there will be considerable discussion of perhaps just that issue, as well as many, many others.

MR. GRENVILLE-WOOD: I suppose, Mr. Chairman, the only thing I am coming to is, there seems to be different standards for commercial viability, and we are talking about minimal problems with a technology that have been raised here by a panel. We have heard, not only in this panel, but in others, of enormous problems in other technologies.

THE CHAIRMAN: The threshold test for demand management is, before you get into anything else, whether it passes the total customer cost analysis. The evidence, as I understand it, from Mr. Shalaby is that this particular technology doesn't pass that test.

MR. GRENVILLE-WOOD: Two points I think that are worth making, Mr. Chairman, that is, that one has to accept that the total customer cost as analyzed

by Hydro is the correct one, which I suppose it comes to our case in chief at some point. And the other is, whether that, in fact, ought to be a threshold test only applied to certain technologies and not to others which is the question that I am posing right now.

THE CHAIRMAN: There is no suggestion it's applied to certain technologies and not to others. There is no evidence of any kind, of that nature, so far with the panel. Now, if you want to explore that you can, but that's my understanding of the evidence to this date.

MR. GRENVILLE-WOOD: That's where I am going, Mr. Chairman, that was the next question.

Q. Is the total customer cost applied to nuclear technology?

MR. SHALABY: A. The cost of nuclear technology is the basis on which we determine avoided cost, nuclear and fossil and transmission, and all the components of our incremental cost assessment, our avoided cost assessment.

[10:34 a.m.]

It's an input to avoided cost, and that is used to evaluate other technologies and whether they are lower in cost than supply or not.

Q. So, what you are saying, then, if I

understand you correctly, is that the nuclear component is what part of the base line data against which you compare total customer cost?

A. That is correct.

Q. So then in the panel when we are discussing nuclear we look at how you have analyzed that base line data for nuclear?

A. That's correct.

Q. I am prepared to do that.

THE CHAIRMAN: Most of it was dealt with in Panel 3.

MR. GRENVILLE-WOOD: No, I understand that, but there are some aspects to it that still need to be discussed later on, Mr. Chairman, I am sure.

Q. I would like to switch now to this -- again in the context of those houses, coming back to that point, that do not have access to natural gas and how we address that problem in getting access to the fuel switching program or demand management through that channel, and I am just wondering whether you have examined the possibility of hydronic space heating using solar hot water, radiators, or what they call water baseboards.

Has that issue been examined at all by the Demand Management people?

MR. BURKE: A. At the risk of going back to some ancient historical studies that may not be considered valid anymore, my understanding of the relative economics of space heating with solar and water heating, domestic water heating with solar, was that the domestic water heating was by far the more economic of the two options, which is why it is typically used as the example for assessing solar, because it is likely to have the best economics.

So, I don't think we have pursued for quite some time the question of space heating with solar, through essentially hydronic systems. That would be the way to do it, but it is less economic than solar hot water heating is my understanding and has been considered so for quite some time.

I am not sure that there is any basis on which to believe that that has changed.

Q. Let me ask you this. Are you aware of any more recent analyses than the ones you just called "ancient history" that would lead you to that conclusion?

Just to put a further parameter on the question, you will recall, I think it was in Volume 47, page 8532, where you seem to indicate I think it was that one of the major problems where you don't have

access to natural gas you have switching to air and you have obviously the issue of ducting, and so on, which is a fairly high capital cost, and whether there are any studies that have done a comparison between those kinds of programs and this hydronic system.

A. Well, I think there are layers and layers of this: first, the issue of economics of using a hydronic alternative to the installation of ducts and still using gas as the source of heating, and that I think was one proposed or referred to by I think it was the City of Toronto in its cross-examination, and at that time we indicated we were aware of the technology but we did not have good cost information for it and hadn't used it so far, and it's conceivable that it may be cheaper than installing duct work where duct work does not exist.

But the issue of whether to use solar panels to provide the heat in the hydronic system is another matter, and it is clear I think from the solar water heater analysis before you that the solar hot water system is much more capable of supplying heat in summer than in winter, and essentially for space heating applications you really stress the system.

You really are trying to get high performance out of the period of the year in which the

system is least capable of supplying heat, and the bottom line is the economics deteriorate and I don't think that we are talking about particularly differences in technology or anything in terms of collecting the solar heat in the first place.

It is just a matter of in order to provide a significant contribution to winter space heating requirements it is just more expensive than the average for the solar hot water heating, and that essentially eliminates it from further consideration at this point in time.

Q. Well, I appreciate the little rider you have just added, but let me ask you this.

I mean, you are extrapolating from solar water heating data, which we may or may not agree upon, but surely you would agree that in terms of space heating in the home that the actual raising of temperature as a result of the use of energy coming from Hydro or natural gas supply or any other source is only one aspect of space heating.

There are other aspects of an integrated plan, are there not?

I will give you a couple of examples. You have some passive solar aspects which would reduce the amount of energy required to heat the space from

external sources; would that not be correct?

A. Well, the R2000 concept at one stage -- I may be getting my semantics wrong here, but certainly in its performance phase there was a point in time at which R2000 houses simply had to meet a performance standard for electric space heating, and passive solar features were certainly one of the options that were tried as a way of cost-effectively reducing the space heating requirements as the energy requirements.

My understanding is that they no longer are the preferred approach to R2000 housing because of problems that occurred with the use of passive solar in the Canadian climate.

Now, maybe there are others on the panel that may have more information than I do on this, but my sense is the option was looked at and hasn't been pursued particularly.

Q. You are saying not pursued by Hydro?

A. No, by the whole R2000 home building industry.

Q. Well, we will get into passive in a moment, but is there anyone else who wants to add to that? Ms. Fraser, would you like to? Because the point, I think, goes right down to the heart of demand

management through uses of these technologies and looking at it in an integrated way.

MS. FRASER: A. No, I don't think I have anything to add to what Mr. Burke said.

Q. No? All right. Now, we dealt in passing yesterday with the question of Hydro at least examining different ways of providing or meeting the energy needs of the province, and I was wondering what thought has been given, again through the context of demand management, which is, as Mr. Chairman will be very swift to remind me, what we are discussing this morning, whether you have examined in more serious ways than I am aware of the concept of thermal utility projects; in other words, district heating in an integrated way as an option for the future - and obviously district heating with a solar component.

First of all, the question of district heating, have you done any studies or any work on that whole concept?

A. We are partially funding a feasibility study with the City of Kingston in terms of the district heating operation there. That, I believe, is still underway.

Q. Do you have any information on that? First of all, the project proposals and any evaluations

that have been done in the meantime?

A. No, I don't.

Q. There are no project proposals before funding this thing?

A. I haven't got them with me --

Q. You don't have them with you, but do they exist?

A. I don't know where it exactly stands in the process. I know that we have been down having discussions with them, and we have made the offer. I don't know if the project is going ahead.

THE CHAIRMAN: What's Hydro's role in this project?

MS. FRASER: I believe it's looking at some cogeneration options and some -- just the district heating options.

Kingston PUC covers gas and electricity, and they're looking at expanding into -- in cooperation I believe with Queen's University, and so we were involved in some discussions, and, quite frankly, I haven't been closely in touch with that project so I can't really speak to it any more than knowing that we have had some involvement.

[10:46 a.m.]

MR. GRENVILLE-WOOD: Q. Just to try and

get a bit more information from you, you have no personal involvement in this?

MS. FRASER: A. No, I don't.

Q. Does your section have an involvement in it?

A. One of my staff was involved in some discussions, and I am not sure whether, because it became a cogeneration project, it may have flipped over to the non-utility generation division.

Q. And in the context of your awareness of the fact that Hydro has contributed money to this project, is that --

A. No, I believe basically we were looking at if there were opportunities for energy saving, then it would qualify under our feasibility assistance plan, and subsequently if they went ahead with the project, it might qualify under savings by design. We basically were down discussing those programs with them and the appropriateness of our participation. I really couldn't say in any more detail since then what has happened to the project, or where it stands.

Q. Can you give me a rough date about when these discussions took place involving staff of yours?

A. I believe one of my staff was down there in December of last year.

Q. Now, in order for it to qualify for a savings by design grant, or for any other incentive payment from Hydro, I presume there would have to be some documentation presented to you.

A. Yes. We were basically down just giving them an outline of the program parameters.

Q. I wonder if I could ask you to again undertake to examine your records, and those maybe of your sister department in dealing with non-utility generation, and produce any documents that are in the public domain obviously, or that are under Hydro's control relating to this project.

MR. B. CAMPBELL: I'm sort of --

MS. FRASER: I think I could probably undertake to provide a briefing note with respect to the current status. If there are some documents that are in the public domain, then they could be attached.

MR. GRENVILLE-WOOD: Q. That would be very helpful. If you could do that, that would be fine. And if Mr. Campbell allows you, that would be even better.

MR. B. CAMPBELL: That's fine.

THE CHAIRMAN: 267. --

THE REGISTRAR: 66.

THE CHAIRMAN: Can't be 66.

THE REGISTRAR: I am sorry, 25.

MR. B. CAMPBELL: Right.

---EXHIBIT NO. 267.25: Ontario Hydro undertakes to provide a briefing note with respect to the current status of the project with the City of Kingston and Queen's University.

MR. GRENVILLE-WOOD: Q. In your understanding, does this have a name, just so we can understand what we in fact -- this is the Kingston project with the City of Kingston?

MS. FRASER: A. Queen's University, as I understand it.

Q. And Queen's.

Now, we got into this discussion because I was asking you if there were any other projects of district thermal heating, and you mentioned this one. Is that the sum total of the --

A. Yes.

Q. Have you examined the options available for large scale storage and distribution of things like less waste heat or solar heat in terms of trying to achieve better district heating opportunities?

A. I'm not aware of any analysis of that.

Q. Is it true to say that there are a number of municipalities that are now summer peaking in Ontario?

MR. BURKE: A. There are, yes. We have provided a list of municipal utilities that recently had summer peaks, as an undertaking to Panel 1, and the number escapes me.

Q. Now, in terms of your expectations, is it expected that more municipalities or municipal utilities will become, in fact, summer peaking? Are we going on a trend toward becoming a summer peaking province?

A. Well, it is the analysis of the load forecast department at this point that we are not, and that the ratio of summer to winter peak has actually maintained itself as relatively constant over time.

We had some very hot summers in the late '80s, and these resulted in summer peak values in many of the utilities listed in that undertaking, and the question remains whether under normal weather conditions some of those utilities on that list would continue to be summer peaking.

But for the province as a whole, our

expectation for the basic load forecast, that is, prior to fuel switching, was that the growth of the space heating load would match roughly the growth of the air conditioning load in the province. So that there wouldn't be a change in that ratio.

Really, what happens there that is perhaps different in considering summer peakedness and winter peaking conditions is that the system itself is much more sensitive per degree change in weather. That is the degree of abnormal weather has much more of an impact on the summer than in the winter. So that the proportionate change in load, you can add 1,000 megawatts quite easily in the summer with about a three degree C difference in daily average temperature. Whereas, that same difference in the winter might only add about 500 or 600 megawatts to system peak.

So, depending on the variability of weather in future, we may have some instances for short periods where summer peaks arise. And we are having to address this issue of how we deal with the variability and the extreme conditions, but under normal weather conditions the expectation is that the system will remain roughly in the proportion that it is today.

Q. To the extent that we get more summer peaking than we have in the past, and I know you

referred to the summers of the late '80s as being hot. I don't think that you would deny that the trend seems to be in that direction, at any rate, from casual observation.

A. Well, I'm not basing my forecast on casual observation.

Q. No, I'm sure you are not.

A. We have a group of meteorologists who advise us on the appropriate assumptions we should be making about weather trends and extreme weather patterns, and their advice is not to extrapolate from the events of the late '80s. So, we are in fact taking about a thirty year average on weather conditions as the basis for planning.

Q. I just hope they take into account global warming trends, but I presume they are, if they are --

A. They have assessed global warming trends in coming to that conclusion. Again, of course, they continue to monitor the issue.

Q. Again, to the extent that we are experiencing some summer peaking changes, would you not agree that in light of what you were saying earlier about - not necessarily accepting what you said, but given what you did say - solar domestic hot water being

more effective in summer than it is in winter, would you not say that the issue of summer peaking makes that option a little more attractive?

A. Well, if I can reply in the hypothetical, were the system to be summer peaking, certainly the value attached to solar hot water heating would increase and the analysis would change. I don't know whether enough to make it economic, but certainly that would be something which would benefit the economics of solar hot water heating.

Q. Thank you very much.

The next question, I think, goes to something I noted from Mr. Wilson. Again, I know Mr. Campbell is sensitive to this, so I will give you the exact page and volume number. It is Volume 48, page 8686. And I will read the quote to you. Mr. Wilson said:

> "The goal of 5200 megawatts for the year 2000 is a challenge that will call for best efforts and not just for Hydro alone ... certainly not the least, the suppliers of other fuels - gas, oil and the solar industry - to extend their supply capabilities and their activity with the province's energy policy.

"To achieve the demand management goal, the one we have been talking about, the challenge has to be tackled by everyone with a spirit of enthusiasm and co-operation. That is how we will approaching it; working in collaboration with everyone who can help us succeed."

It is almost a clarion call to arms. But never the less, could you explain in that context -- I know, that isn't your style, Mr. Wilson. But anyway, could you explain what this comment means as it specifically relates to the solar industry? I don't know whether you were looking forward or looking at existing cooperative measures.

MR. WILSON: A. I'm looking forward, and I think the message here is that the solar energy industry has, I believe, something to offer. And as we move into the '90s, part of our considerations of technologies, ways of improving energy efficiency in Ontario, will be to work with the people in the solar industry, to see if we can find a good, economic match between solar energy options and the job that Ontario Hydro has accepted here.

Q. Can you give me some examples of how you would -- it is very easy to say, I want to work

with people. What sort of things would you have in mind? You know, you have heard from Mr. Burke and Mr. Shalaby, the flag bearers for economic analysis, who say, hey, TCC. Favourite sort of clarion call of theirs is pass the TCC.

A. I think it is mine as well.

Q. All right.

A. It doesn't follow, I don't think, that technologies that fail today will fail three years from now or five years from now. We have talked about working with manufacturers and suppliers of energy efficient equipment to improve the economics, availability and performance. I guess it is a matter of record that our pattern through the ages has been to keep a watching brief on the solar industry. Ms. Fraser was a guest speaker at the last solar energy conference in Toronto.

Q. That conference obviously had an impact on everybody.

MS. FRASER: A. It did. Actually, there were eight Hydro speakers.

MR. WILSON: A. I don't know how I missed it.

Q. Well, next year.

A. Next year.

Clearly we are interested. The developments and photovoltaics, I have to admit, as far as I'm concerned on casual reading, hold some promise. Unit prices per kilowatthour produced has been improving, and it has promised to improve substantially over the next five years.

We are interested. And we are going to be continuing, really opening up the dialogue, and we are going to be coming to the solar industry saying, "What have you got? How does it perform? What are the obstacles? And we will put that in context with the other options we have to work with and the other people in the energy industry, and setting our priorities on that basis.

Q. Well, let me ask you some specifics about this. Obviously this is an interesting dialogue maybe we should have after this panel is over as well, between the various groups that are involved in this. But in any event, let's ask some specifics about this.

To what extent, for example, would you see Hydro taking initiatives in making -- well, one of the factors, I presume, that you have taken into account in saying that it doesn't meet the TCC is, for example, in the solar domestic hot water's initial capital cost. I notice from the back of the envelope

documentation, you were talking about $2,500 as being one of the factors that goes into the initial cost purchase of the equipment is I think estimated at that level. What sorts of things would you have in mind that could assist with making that more easily available, or more attractive to customers?

A. If $2,500 is a reasonable fee, there is not very much that anyone can do that. If you can't change the cost of solar technology, then its very difficult to see how it would become economic.

[11:00 a.m.]

If on the other hand costs could be reduced or performance increased, we would certainly be interested in that.

Q. So, you are saying let the industry either reduce the cost or let the industry improve the technology and then Hydro really would be interested in looking at it again, is that what I am reading into your answer?

A. I think that's certainly my opening position on this thing, yes.

Q. I'm sorry that's certainly your --

A. That's correct, yes.

Q. How can you be saying that you want to help?

A. I don't think I did say I wanted to help the solar industry. I think if the solar industry has something to offer, we will work with them and add solar technologies to the things that we give active support to.

Q. So your analysis of giving active support is just observing what is happening?

I am not trying to put you on the spot. What I am trying to see is, where are you prepared to take initiatives from the point of view of Hydro. I heard you all say - I haven't heard from some of you - but most of you have said that you see a valuable contribution from solar, and some of the papers you have produced this morning say the same thing, but the issue is economics.

The question I am put willing go to you, is Hydro in a position or is it willing or is it capable of assisting with the economics, making the economics more viable? If that's your big concern what sort of programs do you have in mind?

A. I don't have a program in mind. I think that's just the topic that has to be explored.

MR. B. CAMPBELL: I am assuming in asking this question, Mr. Chairman, that my friend is speaking over and above, is there something over and above the

programs that have already been described in evidence. Because Ms. Fraser has programs and industrial programs that clearly are available to help with paybacks for economic projects. I am assuming his questions are beyond that, but I think I would like some clarification of that so that the panel can deal with them properly.

MR. GRENVILLE-WOOD: I didn't know the panel was having a problem with dealing with them. But yes, I am talking about over and above, because those programs don't seem to apply to solar.

MR. B. CAMPBELL: That's just not correct, Mr. Chairman. We have the example we discussed yesterday where there is a solar component, for instance, and Ms. Fraser made it quite clear that savings by design contemplated that sort of thing where it was economic, in conjunction with the whole set of energy efficiency matters. I think the evidence is quite clear on that.

MR. GRENVILLE-WOOD: I will accept there example being put forward, that's Brampton Hydro.

MR. B. CAMPBELL: Mr. Chairman, I'm sorry, my point is not that there is one example. My point is that there is a program which can accommodate anybody who wants to do that.

If my friend is asking something different from that, fine. But I think it is incumbent on him to describe that, those efforts in the industrial and commercial sectors in particular, fairly.

MR. GRENVILLE-WOOD: With great respect, Mr. Chairman, that's for the witnesses to describe.

THE CHAIRMAN: I think you have asked questions as to what kind of initiatives are Hydro prepared to make in the area of solar energy to support the statement that you have quoted from Mr. Wilson and he said, I understand at the moment nothing other than what they are now doing, which they described.

MR. GRENVILLE-WOOD: That's quite correct. I think, Mr. Chairman, that's an excellent summary.

Q. And the issue that I wanted to address with you, Mr. Wilson, was, for example, are there any efforts being contemplated by Hydro to using your billing system or your relations with other suppliers at the municipal level to give information about options through solar to customers, end users, are there any programs in that area?

MR. MacLELLAN: A. No, there aren't, mainly because of the economics. We can't advise

customers that it is cost-effective at this time.

Q. Have you examined the possibility of leasing as an option, which would have perhaps a possible impact on the economics?

A. We haven't but the Ministry of Energy has and we have reviewed the report that was submitted to them. While we have some issues with some of the calculations, it's a possibility. It's still not economic even when you go total customer cost test or you compare it to some other options that we have, but we have reviewed it.

Q. You say when compared to some other options that we have, what --

A. Such as the water heater tune-up.

Q. Now, would you agree that the water heater tune-up is not a demand management measure? Isn't it something different?

A. No, I think it's a demand management and energy conservation measure.

Q. Well, that's the point I am making. Does it affects demand, does it just effect energy?

A. Both, as you can see from my back of the envelope, it affects both demand and energy.

Q. Well, I haven't had a chance to look at it very carefully, but don't you still have to meet

the same peak demand?

A. No, it reduces peak demand by about 70 watts per tune-up.

Q. Well, I will look at it in a moment. I don't want you to take up any more time with that.

So, your position is it does, in fact, affect demand; it's not just an energy matter?

A. That's right.

Q. So, that is one comparison you have done. And you did that in the context of the leasing option as well?

A. Yes, we looked at it briefly.

Q. Briefly?

A. Yes. We took a look at the leasing option.

Q. How briefly is briefly? I would just like to know whether you did another back of the envelope analysis or if there are any documents somewhere?

A. There are no documents. I read the report, I looked at what they were requesting from Ontario Hydro to make a leasing option viable.

Q. Who is "they", sorry?

A. They were the consultants that were submitting a report to the Ministry of Energy. And in

discussion with some people in our department, it was decided that it was still not viable.

Q. Okay. But you don't have any report that comes out of that discussion or anything that led into that discussion apart from consultants' report from the Ministry of Energy?

A. No, we don't.

Q. Do you know who the consultant was from the Ministry of Energy?

A. I don't remember it right now.

Q. Could you, if we have a break, try to refresh your memory and let me know?

MR. B. CAMPBELL: The government is represented in this hearing, Mr. Chairman. I think in my friend wants to pursue work done for the Ministry of Energy, he should pursue it with the government representative in this hearing.

MR. GRENVILLE-WOOD: I certainly will, Mr. Chairman. I am just wondering if the witness has easy access to it, that would save some time for us all. But if that's the position Mr. Campbell wants to take, I am quite prepared to pursue it that way.

Q. In the context of your programs, Ms. Fraser, have you got a specific component dealing with analysis or assessment of the solar potential?

MS. FRASER: A. No, I haven't.

Q. Do you have any intention to do so?

A. At this time there are no plans to do so but it might be something worth considering in our next round of business planning.

Q. Maybe if you attend another solar conference.

A. Perhaps. Maybe if I am invited to speak again.

Q. I would like to look specifically now, if I may, at passive solar technologies. Two particular programs were mentioned explicitly in your direct evidence, one was the high performance windows for residential use and the other was film for commercial use, window film. Of course these are of special interest to SESCI. Now, were these programs originally identified in the 2,000 by 2000 target, or are they a segment that you referred to in Volume 47, at 8442, that is now identified but wasn't identified earlier?

MR. BURKE: A. The commercial sector use of window film was not included in the estimates presented in the DSP for EEI. As you may recall in the DSP, I think the identified number was something of the order of 1,700 megawatts. But it was included in

Exhibit 76 as part of the 2,000 megawatts.

In the residential sector the degree of window upgrade was, I believe, the same in the DSP as it is in Exhibit 76.

I am not sure whether we were explicit in the DSP in saying that the R-value of 3.2 for the window would be achieved through argon-filled low emissivity windows. But I think the R-value for windows was 3.2 at the time, which is the same as it is in Exhibit 76.

Q. So, you are saying that the 2,000 by 2000 includes any reference to those two programs; am I correct in that?

A. I thought your question was asking me to contrast what was in Exhibit 76 with what was in Exhibit 25, the background to the DSP.

Certainly the direct evidence was that both are in Exhibit 76 and are part of the 2,000 megawatts.

Q. Do you have, apart from that, do you have anymore recent information on the savings figures for those two technologies, the window film and the high performance windows?

A. I don't. Essentially, I would get that information from our research division or energy

management branch in a second round update to Exhibit 76. We haven't been able to do that this year. Essentially everybody has been working on the hearings. But maybe Mr. MacLellan knows of something coming down the pike.

MR. MacLELLAN: A. Yes. We are tracking the efficiency of residential windows.

Q. Commercial window film, are you tracking that?

MS. FRASER: A. The latest data that we have on window film is included in Volume 1 and 2 of the PCRD under savings by design window film.

Q. Can I draw and your attention now to that prefile that we had, it's filed as Exhibit No. 315. Have you had a chance to review this?

MR. MacLELLAN: A. Yes.

Q. Good. Now, I think in looking at the graph, I think you will agree that we have been able to show in this graph from our analysis that window technologies - the high performance windows especially - have energy savings potentials significantly greater than those targeted by your incentive level.

A. Those technologies do exist, yes.

The one thing I would like to comment on

the graph, you have our incentive program extending out to 1996, and the current program is only extending to the end of 1994.

Q. All right. Well, I am not sure if that's good or bad news. Probably bad news. I guess. Thank you for that.

A. It kind of depends what we do upon renewal, if it's good or bad.

Q. Now, would you agree as a result of at least that projection of higher potential, would you agree that window technology has an economic viability potential greater than that that you are targeting for?

A. Yes. As I say, the technology to exceed those levels do exist. They are not, as I understand it, broadly available. A couple of manufacturers have significant improvements over the performance level that we are targeting. But we are trying to achieve some critical mass in the marketplace. We are trying to effectively move the standard from double glazed up to low "E" argon filled generally, or at least low "E". So in order to do that you have to have a fairly broadly available technology.

However our performance level isn't static. We are not committed to the same performance level throughout the period of the program. And the

advantage of having only a three year program is it can be substantially revised at the end of that period.

So, we are closely tracking these developments to see if we need to change that performance level.

Q. You tell me that this program goes now to 1994.

A. Yes.

Q. Are you in the process now of evaluating the targets or when would you be doing that evaluation?

[11:15 a.m.]

A. Well, the program has only been out for maybe four months now, so it's a little early to evaluate the success of it, how it's going. I know we have got a large number of applications, and we expect that the market share of low "E" windows is increasing quite substantially, but we are not in a position where we can evaluate that yet.

We don't want to change the performance level often because that just confuses everybody, but, as I say, we are tracking developments in the marketplace.

We are also tracking the possibility of standards. That makes a big difference in where our

performance level is set because it essentially sets the floor, and the difference between the floor and our performance level is what we can call the influence of the program. There is a margin --

Q. What you call the what?

A. Pardon?

Q. There was someone blowing his nose just as you said a word and I missed it. Sorry.

A. If I can remember, I said the difference between the floor as set by a standard and our performance level is what we can call the influence of our program.

Q. Influence? Okay. Thank you.

Now, within the context of your program, I know it's a new program, but to what extent are you looking at technological improvements? I mean, you can see from our graph that at least we are tracking fairly significant technology improvements over the next eight years.

To what extent are you working in that, in analyzing and tracking that?

A. Well, we are watching it. We have our research division working on the various window technologies as well, making sure that we know what they are and how they perform, and when it means that

there is enough interest in the marketplace, access to the technology, et cetera, then we will decide whether or not to change the performance level.

Q. In your projections for the attainable EEI, am I understanding you to say you are accounting for some improvements in the technology, or are you just doing a cut-off date of existing technology and projecting that forward without any improvement of it?

A. I will have to refer that one to Mr. Burke.

MR. BURKE: A. The estimate for the year 2000 is based on the low "E" argon-filled window with an R-value of R3.2, and that has a lifecycle cost of about 4.6 cents per kilowatthour, which passes the total customer cost test but it leaves room for probably about 30 or 40 per cent, at the most, cost increases in some new technology before it would become uneconomic.

My understanding is that the costs of the next round of technology are not clear yet, and that's the reason we haven't gone beyond the point we have, but I guess my point would be that we are getting close to the point of where the economics start to fail.

This is a fairly expensive technology as

it is, has about an 11-year payback to the customer as it stands, so the steps beyond it -- I notice on your graph we are going from something like $65/70 something about $120 at the next block. There is a risk. I haven't done the analysis, but there is a risk that that would be pretty close to the margin or over it.

Q. Can I just draw your attention, I think you have misunderstood the graph. I think it may be useful just to make this clear. The incremental cost is still at the range of $50.

A. Oh, I see.

Q. The figure, the blocks, the dark filled-in blocks relate to the energy savings which relate to the left-hand side --

A. Certainly, if the numbers were to turn out as you describe them here that looks like an improvement, but it is my information or the information that we had at the time we did this that that sort of cost and performance data was not really firm, and so we did not base the analysis on it.

Q. So would that mean to say that, for example, things like evacuated windows, evacuated glazing, which is expected to be on stream by between now and the end of this decade, does not form any part at all of your forecast?

A. No, we have explained this issue at length, the question that certainly there are evolving technologies with evolving costs and performance and so on, but for us to speculate on where those things will end up and base a plan on that is not very useful.

It is not clear that it necessarily changes the megawatt impact over time either, which we discussed as well, but technology at the bottom end is evolving as to what will be economic to customers to pursue as their base case, natural window installation, and so while the technologies at the margin may be improving, it is also the case that the base case technologies are improving.

It is the difference we are looking for. It is not clear that necessarily the difference will be any larger because of the evolution of technology. All of this really gets into a realm of speculation that we are not engaging in for the purpose of this analysis.

Q. Which base case technologies are improving?

A. What is assumed to be the heat loss through windows in a typical house in the future, what people will choose as their normal replacement window in an existing house or what new housing will install as a typical window without Hydro incentives.

DR. CONNELL: May I ask you, does any member of the panel know, using these units - that is, watts per square metre - where having no window at all would be plotted?

MR. BURKE: It's infinite heat loss, isn't it.

DR. CONNELL: But I presume zero on this graph is whatever was the standard window, single glazing in 1980, was it?

MR. BURKE: Well, typically each pane of the window is considered to have an R-value of about 1, and so a single glazing in 1980 would have been about R1. I don't know whether that...

MR. GRENVILLE-WOOD: If I could just intervene, my advisors tell me that, as you can see from the graph, the base case here is residential double-glazed casement.

DR. CONNELL: Oh, I see. Thanks.

MR. GRENVILLE-WOOD: That equals zero, so it is improvements on that. It is not on no windows at all.

DR. CONNELL: So what is a well-insulated wall?

MR. MacLELLAN: A well-insulated wall without a window?

DR. CONNELL: Yes, compared to a double-glazed, standard window of 1980.

MR. MacLELLAN: I can't describe it in watts per square metre.

A residential, double-glazed casement is about R2, and the current Building Code wall is about R20. R18, I believe it is.

So windows have a substantial heat loss. Even the very much improved windows that are coming on the market are still substantially higher heat loss than a normal wall. Now, once you calculate solar gain into it, then it complicates the issue.

MR. GRENVILLE-WOOD: Q. Again, I am not sure if that answer Mr. Connell's question, but my advisors inform me that R40 in the context of the R2000 home is the wall factor. Is that the ceiling factor?

MR. BURKE: A. Ceiling factor.

Q. Ceiling factor.

MR. MacLELLAN: A. R2000 is R20 walls and R40 ceilings.

Q. R20? Thank you.

A. One of the things we are doing to try and capture these improving technologies, as you are mentioning, is to create a two-level incentive program.

That way we might be able to accomplish

two objectives at the same time: one to being improve the standard, bring the whole market up; and the other being to still provide a measure of incentive for those people who exceed the standards.

That's the case in a number of different product areas; certainly, the case in windows. That's really two of the three areas we try to pursue, the third being standards.

Raise the floor, then raise the standard, but still provide some incentives for better than the standard.

Q. What about high performance glazing in commercial situations? What's the story on that?

MS. FRASER: A. That's eligible under savings by design, and a number of the -- actually, the project I talked about yesterday, the Roseglen Public School, included high efficiency windows as well, and that was part of the energy savings, demand savings that resulted.

We are certainly encouraging that every application we get, to improve the thermal envelope overall, including the windows.

Q. Does that include or is that only for new designs or does it apply to retrofitting?

A. It is certainly strongly pushed in

new designs.

In retrofit the -- a project which just changed out windows would not be cost-effective on its own. If the building was undergoing a renovation or some kind of redesign, upgrading to a higher thermal value window would be absolutely part of savings by design, and we would encourage that as well.

Q. Within the context of your programs, either of you, is there any thought to increasing the incentive in correlation to the efficiency of the windows that are put in? In other words, if you go to a higher technology do you get a higher incentive or do you just get the same incentive just by improving the performance?

MR. MacLELLAN: A. As I mentioned, we are contemplating a two-tiered incentive structure.

Q. Yes.

A. But creating an incentive on let's say a percentage improvement over the base case, you know, dollar per watt per square metre or something like that, a real nightmare to administer, and very difficult for consumers to understand. So we find it's better to have a couple of set tiers and change the performance level of those tiers when the market situation permits or suggests.

Q. I see.

MS. FRASER: A. In commercial we pay on the basis of kilowatt savings, so a technology which delivers more savings would get a higher incentive. In addition, the enhancement to savings by design which will be announced next year, which will be based on ASHRAE 90.1, will include incentives to move people up to that standard and then more enriched incentives to go past. So that's exactly what we are trying to do.

Q. That relates to an envelope analysis, not to a particular technology analysis; correct?

A. That's correct. Total building is a system. It's a performance-based standard.

Q. Is it possible in the context of that -- well, no, that's all right. Thank you.

Mr. Chairman, I think probably it's time for a...

THE CHAIRMAN: How much longer do you think you are going to be?

MR. GRENVILLE-WOOD: Probably go to the lunch break, Mr. Chairman.

THE CHAIRMAN: To the lunch break? Thank you.

THE REGISTRAR: We will recess for 15 minutes.

---Recess at 11:29 a.m.

---On resuming at 11:50 a.m.

THE REGISTRAR: Please come to order. This hearing is again in session. Be seated, please.

MR. GRENVILLE-WOOD: Mr. Chairman, I'd like to just discuss, before I resume my questions, the solar water heaters briefing memorandum, the response to Undertaking 267.23.

A couple of things, I guess. No. 1, as you know, this was produced at 10:00 this morning. Quite frankly I would want to do some careful analysis of the numbers in here in order to properly cross-examine the witnesses on this. Probably this is the panel where this should be done. I can't see that I could do it in any other panel.

The second question I suppose is why, since it was produced on June the 14th, 1991, it hasn't been produced to us earlier. But be that as it may --

THE CHAIRMAN: Was it asked for or a question that would require it to be? If it wasn't asked for, I don't think there is any reason why it should have to be produced.

MR. GRENVILLE-WOOD: It is very hard to ask for something you don't know exists, Mr. Chairman.

THE CHAIRMAN: Parties have not been

reluctant in this proceeding to ask things that they don't know about.

MR. GRENVILLE-WOOD: No, no, Mr. Chairman. But you will recall that certainly in Panel 3 and in Panel 1 we asked whether any studies had been done of solar technologies, and the answer was nothing since 1983. So, obviously, that probably generated some work which produced this report.

I mean, in addition to that, I think there was an undertaking given in Panel 3 with respect to producing any further studies. I haven't had an answer to that undertaking, but I understand the volume that has to be dealt with.

In summary, I guess my point is I need to have some time to digest this thing. There are some calculations in here, which even a whiz like my advisor here can't run the figures through. What I am saying, I suppose, is I need some time in order to be able to properly cross-examine on this document which is now before us. What I would suspect is the best way of dealing with this is would be for me to complete my cross-examination that is prepared, and ask indulgence of the panel to allow me to have an hour or so at the end of the session on this panel, to come back and examine them on --

THE CHAIRMAN: The session on this panel may finish today.

MR. GRENVILLE-WOOD: You are planning to be finished today?

THE CHAIRMAN: May finish today is what I said. At the latest, on Monday morning.

MR. GRENVILLE-WOOD: Well, my understanding, if I'm correct, is Mr. Rosenberg has a day. If he starts after lunch today --

THE CHAIRMAN: Well, he may finish at the end of the day, we just don't know.

MR. GRENVILLE-WOOD: It is possible.

THE CHAIRMAN: You know as well as I do, estimating time of cross-examination is a very chancy business.

MR. GRENVILLE-WOOD: But the bottom line is, Mr. Chairman, I want some time to be able to study this document, run through the figures and conduct a cross-examination on it. If there is someone who can give me some advice as to a better way than doing it at the end of the cross-examination of other intervenors, I'd be more than willing to accommodate.

THE CHAIRMAN: Well, can you do it Monday?

MR. GRENVILLE-WOOD: Yes, I think -- you

know, I mean -- I'd have to come back, but, you know, that's not impossible.

THE CHAIRMAN: All right, we will do it Monday then.

MR. GRENVILLE-WOOD: Thank you, Mr. Chairman.

MR. B. CAMPBELL: Mr. Chairman, I am not going to let sit on the record Mr. Grenville-Wood's comments about providing information. We have made extraordinary efforts and Hydro's staff have made extraordinary efforts to provide information, as requested, in as timely a manner as we possibly can.

What you have before you is a briefing note that Mr. Shalaby had prepared for himself, and I'm quite happy that the undertakings and all matters of information requests are being fully and fairly dealt with by Ontario Hydro.

I might just note for the record that if there were particular concerns about this, or if there were questions of many of the other types of questions that we have had during the course of this cross-examination, they could easily have been dealt with in interrogatories, saved hearing time, and in fact what we received from this party by way of interrogatories was five questions last Tuesday. Now

we have done our best.

MR. GRENVILLE-WOOD: Mr. Chairman, you know, I don't want to get into--

THE CHAIRMAN: Perhaps we shouldn't then.

MR. GRENVILLE-WOOD: --an out-and-out battle, and I won't. My comment with respect to June 14 report stands. Anything else, let's take as gratuitous commentary from both of us; certainly the latter one.

In any event. So I will proceed then on the assumption that on Monday at some time we will set aside some time to deal with that. Thank you, Mr. Chairman.

Q. Now, we have been discussing in some detail the window technology, and from what I have understood from some of the answers we are getting is, certainly from Mr. Burke and with respect especially to improvements in the technology, that it is fair to say that the estimates that have been made for the potential contribution of this technology are relatively conservative. Is that a fair statement to make?

MR. MacLELLAN: A. You mean from a load forecast point of view or from a program point of view?

Q. Well, first of all, presumably what I

have heard you say, because you are only projecting forward on current technology, that from an energy point of view, because you are only using current technology, and I understand the program has only been in place for a number of months, that you aren't taking into account any improvements in technology in the estimate of the potential, correct?

THE CHAIRMAN: This is a matter -- are you talking about load forecasting or are you talking about program design?

MR. GRENVILLE-WOOD: I haven't got to the load forecasting aspect, yet, Mr. Chairman.

THE CHAIRMAN: It's program design you are talking about?

MR. GRENVILLE-WOOD: Yes.

MR. MacLELLAN: In terms of program design, we have the flexibility in the program to change the performance levels or change a one-tier program to a two-tier program as we see fit and as we see the technology progress. So we are not ignoring any potential.

The report that you filed is a good summary of where the potential is. And that doesn't surprise me, because the author, assuming it is the same person, was a fellow we retained as a consultant

when we were developing the program. So the program shouldn't be all that different.

There is lots of flexibility in it. We are tracking the potential. We want to get whatever we can from this window technology.

Q. All right. Now assuming then that -- you say you are tracking carefully. How quickly does your information of tracking then get back into the load forecast process. As I say, we are coming to the load forecasting.

THE CHAIRMAN: That is a separate question, and I think Mr. Burke has answered that question about three or four times in the course -- it is not an easy question to answer. But the treatment of new developing technology subsequent to the present time is something that has been dealt with quite a bit in this panel, but perhaps if Mr. Burke wants to do one more re-fix position of it, we will tolerate that.

MR. BURKE: Well, if it is helpful, in the case of windows, for example, we assume that new technologies that emerge for windows at the higher cost, greater savings end of the spectrum will also be effectively matched over time by the lowering of the cost of the current technologies that are at the margin. And the increasing application, naturally, of

more efficient window technology, and that is built into the basic load forecast. There is a provision in the basic load forecast for the natural improvement in thermal envelopes, in existing houses and new houses, and window upgrades are part of that.

So that what really matters from the point of view of the plan is not that we have specifically labelled each element of attainable potential in terms of some exotic technology, but that we have correctly estimated the megawatt savings between what will happen naturally and what is at the margin for windows.

We believe that we have done that as well as we can by looking at what is at the margin today, and what is currently the practice today, and taking that difference. And while the technologies themselves may evolve over time, the megawatt impact, as has been my evidence several times, is probably best estimated by what we can fairly concretely talk about today. The risk is that one or other of these ends of the spectrum may -- the economics may evolve more rapidly than the other, and then the estimates may be over or understated.

It could very well be that some breakthrough occurs which makes windows incredibly

cheap to be efficient, in which case there would not be a need for an inducement by Hydro through incentive programs, and the natural up-take in windows may turn out to be very high, and therefore the amount that we would subtract from the basic load forecast would diminish.

The opposite is also possible. That the basic cost of windows doesn't change much, but there are incredible improvements at the high end, and that allows us to subtract more down the road.

But my best shot at this time is with things that we know and can quantify, and essentially that's what we have done.

MR. GRENVILLE-WOOD: Q. Now, just to close off this area very quickly, I presume then you don't see it as part of your process to have an objective of increasing market penetration or increasing the use of improving technologies, and then have a plan in place, and I know there is a planning panel that will be dealing with this later, a plan in place to try and achieve those objectives in terms of use of such technologies. Is that something that is unrealistic to put forward to you?

MR. MacLELLAN: A. That is a program objective fairly well stated.

Q. But that program objective and activities that then Hydro undertakes to meet that program objective, including incentives, including all these various things we have talked about, that aspect of things, from what I'm hearing Mr. Burke say, it doesn't necessarily fit back into the forecasting.

MR. BURKE: A. No, I think you missed my point.

Q. Because in 1990 you eliminated solar as compared to 1989 load forecast. Now that presumably was independent of the decision to implement this incentive program.

A. I have to admit you have lost me on the question. Certainly where I thought you had misunderstood earlier was that it doesn't really matter -- we recognize that technologies evolve. There is no question of that.

What I was trying to explain was we are not anti the evolution of technologies by suggesting that we use today's technologies at the extremes, and at the sort of normal market level as the basis for estimating the per cent improvement in window efficiency that we can expect to obtain through Hydro programs.

We are just saying that is the best

estimate of the number. The technologies which actually bring it about will evolve, and that is likely to be the way it happens. There is nothing that says in the way we do this, that we have we've decided to freeze technologies for the world. We recognize technologies evolve. We just don't know how they will volume and what the costs of them will be, what the real energy savings of them will be, so we are using current estimates of the difference between the high cost and the base cases technologies as the basis for that estimate.

There is no sense in what we are doing that says we've ruled out new technologies. Far from it. We're just saying all technologies in the window area evolve, not just the most expensive ones.

Q. I think I'm going to let that matter sit where it is, but the point I think was just that the link between incentive programs and load forecast didn't seem to be that direct for me, but we will let that sit, and we will deal with it in the planning issue and in our direct.

Now, Ms. Mitchell, in her direct testimony, Volume 48, page 8653 said, and I'm quoting her:

"Design of our current programs

illustrates our commitment to building and supporting channel infrastructures which include municipal utilities, manufacturers, distributors, retailers and builders."

[12:05 p.m.]

For your high performance window incentive program, how many levels of the support channel are eligible for incentives?

MR. MacLELLAN: A. The incentive is given to the consumer.

Q. Anybody else?

A. No. The incentive as it's currently structured pays the full incremental cost, typical incremental cost between double glazing and a low "E" window. By doing that, we allow the manufacturers and the retailers of those windows to market their higher efficiency product on an equal basis with a less efficient product.

So, they are getting an indirect incentive because their marketing programs are enhanced.

Q. What about the situation of the builder of new buildings, are they eligible at all?

A. You mean homes or buildings?

Q. Homes.

A. The builder doesn't receive an incentive. I am trying to remember exactly how that incentive flows.

Q. My understanding was that the owner in terms of a retrofit is eligible and the builder in terms of new building was eligible for the incentive.

A. Could I check on that for a second?

Q. Of course.

MS. PATTERSON: What page was that again, Mr. Grenville-Wood?

MR. GRENVILLE-WOOD: Sorry. 8653, Volume 48. It's a quote from Ms. Mitchell which I read. I don't have the precise line number.

MR. MacLELLAN: I'm sorry. I can't say exactly how that incentive flows, whether it's paid directly to the builder or to the purchaser of that home.

MR. GRENVILLE-WOOD: Q. I guess the point I was coming to, is that in terms of the incentive program you aren't dealing with a number of other groups that would be key, for example, with manufacturers, with distributors, with retailers and with renovators, all of those people who will be absolutely essential to ensure a greater market

penetration?

MR. MacLELLAN: A. We are certainly dealing with them, no question about that.

We are helping them with their certification process, we are doing a lot of advertising effectively for them to promote their low "E" windows. We are making sure that they are aware of the windows program, and they have a lot of input as to the design of the program. That's where we get our information as to which products are appropriate to be on the program, what kind of a incentive levels are appropriate to make the market move.

We are certainly dealing with them but they are not receiving direct financial incentive.

Q. There is no incentive for them at that level? That's what the point, I guess, was.

A. No direct incentive, just probably an easier marketing the product and likely greater profits.

Q. Let's deal with the marketing of the product. You said you did some advertising, what sort of advertising do you do?

A. We have a province-wide advertising campaign to promote low "E" windows. That will be evolving over the next three years in the course of the

program. It will be promoting low "E" windows to homeowners.

Q. Sorry, this is a program in the future?

A. It's under development right now. I don't believe any has hit the marketplace, but it's certainly starting soon.

Q. All right. Now, with respect to providing assistance to the other sectors, that presumably is creating demand for the product. What about dealing with the retailers and renovators and so on, what kind of assistance are you providing them?

A. The advertising assists them as well.

Q. Will assist them?

A. Will assist them, yes.

Again, there is no direct financial incentives, but again they add input to the program and they have information about the program.

Q. Is it not correct, though, that in terms of the program itself, every manufacturer has to submit his window to a fairly extensive testing process before it can be made eligible for the customer-driven incentive program?

A. That's correct. We want to make sure there is as much quality control as possible with these

windows.

Q. Who absorbs the cost of that testing program?

A. The manufacturer.

Q. I know the program is only in place for a few months now. Have you done any comparison about the investment required by the manufacturer as compared to the incentive paid to the customer yet? Do you get what I am saying? In terms of dollars invested in the program as between Hydro paying incentives out to customers and the manufacturer having to pay for the testing process.

A. No, we haven't but the testing is, as I understand it, not all that expensive. It's a lengthy process, but in terms of out-of-pocket expense I don't believe it's all that much.

Q. All right. And you don't have any estimate of how much you have put out of your pockets right now on the incentive program, do you?

A. No.

Q. There is no four month figure or three month figure, or anything like that?

A. I really think it is too early to use that kind of a figure. I don't have it with me and I think it is too early to say whether it's been a

success for failure based on --

Q. I am asking just for dollars.

A. No.

Q. You don't have that. That's fine. Thank you.

Volume 47, page 8669, reference was made to overhead No. 18 of Exhibit 260, talking about commercial sector technologies.

Now, Mr. Burke I think was testifying at the time and he made reference to lighting related matters, and in that list he referred to automatic lighting controls. But in his particular comments when he was highlighting the overheads, he didn't make reference to automatic lighting controls.

I just wanted clarification from Mr. Burke, are we talking there about daylighting controls?

MR. BURKE: A. Well, on page 18 there is something called automatic lighting control system. Are you now asking me to amplify what we meant by that?

Q. First of all, in your actual remarks, when you were going through that, you didn't make reference to automatic lighting controls.

I just wanted to see whether you were referring to daylighting controls in that.

A. I think that they are primarily

systems for having the ability to control lights in various parts of the building. By daylighting controls, I think people typically mean controls that are sensitive to the amount of daylighting that exists coming through the windows of the building. I don't think that the particular systems that are implicit in the analysis we have done are necessarily controlled by photovoltaic cells automatically controlling the lighting in the premises.

I am not sure. It could be that those lighting levels are set just through some sort of program for the lighting that reflects --

Q. Sort of time based rather than light based?

A. Yes. Certainly for the technology for dimmable ballasts, electronic ballasts for T8 lamps that are sensitive to daylighting, that technology was not implicit in the estimates done here.

Q. Now, in the DSP reference is made on page 7-22 to a daylighting incentive program, but the commencement date of that program is 1994. Is this still a current plan?

MS. FRASER: A. That may be accelerated depending on the rate at which the dimmable ballasts become commercially proven and available.

Right now my understanding of that technology is it is about a year away from being broadly based and available.

We would certainly entertain any proposals under savings by design that would deal with that.

In our lighting program we have lighting controls which are both occupancy sensors and photo cells.

Q. Are you aware that there are a number of working examples of this in Toronto, for example, Bell Trinity Plaza, are you aware of that?

A. No, I am not aware of that.

Q. How about Scotia Plaza?

A. I am not aware of the Scotia Plaza system. I am not aware that they are using dimmable ballasts, anyway. They may be using time controlled daylighting.

We did an architectural study to look at the potential and it included daylighting, and that is certainly something that we are very interested in, and I believe that study will be coming to you in one of the interrogatories that we are in the process of answering now that we received last week.

Q. Thank you. I don't want to mislead

you with respect to Bell Trinity and Scotia Plaza, I wasn't referring specifically or exclusively or in any way necessarily to dimmable ballasts, but to the whole integration of daylighting concepts in those projects; in other words, in terms of the impact, having concern for daylighting in the planning and so on?

A. Yes, I understand that both of those buildings are what we would say are sort of state-of-the-art engineering.

Bell Trinity has a very being advanced thermal storage system, although I understand that the thermal storage system in Scotia Plaza is not yet commissioned.

Q. Do you have any studies with regard to the EEI for daylighting? Have you done any work in that field at all?

A. No. The architectural study that I referenced sort of was our first step at looking at technology, and then we have to get some experience in terms of being able to estimate the potential. It's certainly something that we are very interested in.

The whole concept of daylighting is also imbedded in ASHRAE 90.1 in terms of credits and the performance based standard there.

Q. Did you say you had a preliminary

document that you are going to be sending to us in response to an interrogatory?

A. That's true. It's a look at various architectural, call them technologies, if you will, but different ways of architecturally designing a building in terms of the way in which it's oriented and in terms of solar heat gain, all these sorts of things. That study will be forthcoming attached to one of the interrogatories. It's been submitted to other intervenors in response to interrogatories as well already.

Q. Thank you. My understanding from the two window programs that we were discussing earlier, was that there was an emphasis that you put on with respect to winter heating in the residential program and summer cooling in the commercial program. I am just wondering why you have --

A. It does both, the window film does both. We can see reductions of solar gain up to 79 per cent in the summer, and the low "E" coating can also included the R-value of the window and will decrease loss of up to 35 per cent in the winter, heat losses.

Actually, our first project under savings by design was a window film project with the University of Toronto. We have since used that project to

showcase the technology in those publications that I was telling you about earlier.

Q. As a matter of interest, have you compared or done an analysis or thought about the impacts of this window film on the daylighting, sort of integrating the net effect?

A. At this point we haven't, but it is certainly something that would be interesting to pursue.

Q. I know you have accepted the R2000 program, providing incentives to help reduce the energy requirements of new housing. Now, are you planning on taking this any further in terms of dealing with developers, municipalities, and so on, with respect to subdivision planning for solar orientation?

MR. MacLELLAN: A. We don't have any plans to do that right now.

Q. The question presents itself immediately, why not?

MR. B. CAMPBELL: Mr. Chairman, I think this matter has been dealt with specifically in earlier cross-examination on behalf of the Voice of Women, and I think my friend -- that matter has been dealt with as to how subdivision plans are dealt with.

THE CHAIRMAN: I think the question is

confined to why solar hasn't been considered; is that right?

MR. GRENVILLE-WOOD: Solar orientation.

THE CHAIRMAN: Solar orientation hasn't been considered.

Perhaps you could answer that question.

MR. MacLELLAN: I don't think I can. I can say that it hasn't been, but I don't have any justification for that.

[12:18 p.m.]

MR. GRENVILLE-WOOD: Q. Is there any plan in anyone's scope of future planning with respect to talking to people who are involved in design so that they can incorporate proper or appropriate solar design in their work? I am talking about architects and designers of projects, and so on.

MS. FRASER: A. That's exactly what we use electric options for, is to the consulting engineering and architectural community, and our field staff are very actively involved in discussions with those key decision-makers with respect to a whole range of energy efficient technologies.

And, as I said, something like electric option on window film would highlight that application, and as we get more examples and produce more of those

things we consistently...

We also have a newsletter to offices. We use direct mail to consulting engineers and architects as well as face-to-face contacts and visits, seminars. We will be holding product knowledge days for when we introduce the ASHRAE 90.1 standard, and we will be covering a whole range of technologies, and our target market for those product knowledge days will be architects and consulting engineers.

Over the past six or seven years Ontario Hydro has really expanded its contact and mailing lists of who we deal with on that side, so it's very critical to us.

Q. So, if I understand it correctly, the program consists of sending newsletters and information pieces to mailing lists that are focused on designers and architects and engineers; is that --

A. That's part of the program. That is what we use electric options for, and that's why we develop various newsletters.

We also participate in trade shows which target the design community, such as Construct Canada; we are involved in the organizing committee of that; BOMA, sponsored by the Building Owners and Managers Association, which also includes a number of consulting

engineering and architectural firms.

We use direct one-on-one contact with our field staff. In our Metro Central office there are individuals basically dedicated to dealing with the design community.

Q. Okay. Now, how much of this relates to particular solar technologies?

A. They will be carrying the messages with respect to all of our energy efficient programs, and they keep them abreast of as -- we added lighting controls, for example, in April of 1991. They would get that message out as best they could.

Q. You are talking about time-related lighting controls?

A. No, that was both the occupancy and photocells, which are included in the lighting program.

Q. That's something to be done in the future?

A. No, that's already in the program.

Q. That is already being done?

A. Yes.

Q. You said they will carry it, so I thought...

A. Oh, they will carry anything that we give them.

Q. How much specifically with respect to solar orientation, as an example, have you done in the past to these communities?

A. I would say in terms of the electric option for window film we have had one Electric Option and one additional Power Saver News, which showcased the U of T project.

The implementation of a prescriptive incentive for window film so that customers wouldn't have to go through the more detailed analysis that is included in the customized aspect, when we announced that we certainly got that message out to that community as well.

It's not as if we divide our time up between one technology and another. What we are trying to do is maintain channels of communication both ways on a whole host of things, and that's what we do.

Q. Let me ask you a specific example. Now, if solar domestic hot water heating is termed by Ontario Hydro to be failing the TCC test, I presume then it won't be used as part of this program? Is that a correct assumption?

A. We will not provide incentives for it, and to the extent to which customers were interested in that we would assist them in providing

energy services along those terms, but, yes, right now technologies which are not cost-effective do not form a part of our program per se.

Q. Just as a matter of interest, have you approached, for example, institutions, educational institutions? You said University of Toronto. What about, you know, high schools and so on for encouraging them to use, for example, window film?

A. Yes, we are targeting all institutional and commercial buildings in the province with our window film program.

Q. Can you tell me how you are doing that, what sort of --

A. With all the various techniques I have just told you about, in addition to advertising on our programs generally, in a whole host of the business press.

Q. Have you gone to school boards, as an example?

A. Yes, our field staff visit school boards. They are, I indicated, one of their key accounts, and actually school boards have been very active in participating in our savings by design program. I don't know how many of them have taken up window film per se, but that's certainly...

Q. I am just interested in whether you have any computer modelling tools in terms of assessing the impact of various passive solar applications.

Can you tell me if you have any modelling tools that you use?

A. I mentioned load shaper yesterday. That's a product of Synergic Resources and Morgan Systems. It does building energy simulation. I am not sure what degree that -- when solar technologies are built into that system as canned options as opposed to what has to be imputed on a --

Q. So there is no dedicated model that now analyzes solar technologies, passive solar technologies?

A. None that I am aware of.

Q. No.

MR. BURKE: A. For the residential sector the Hot 2000 model, I believe, is sensitive to solar features and solar orientation of buildings. It is, I think, produced by the federal government to quite a standard model.

THE CHAIRMAN: What was the name of that model again?

MR. BURKE: Hot 2000.

MR. GRENVILLE-WOOD: Q. Not quite sure

what the implication is there, but we won't get into it.

MR. BURKE: A. No, I'm not either.

Q. Turning to Volume 62 on page 11035, in response to Mr. Mondrow, there was a general question regarding constraints to implementing demand side management options, and I think the understanding I got from that question was that money per se is not the major constraint; in other words, that there are funds within Hydro, especially in recent times, that are available for use in this context.

Now, with respect to solar technologies, I know the answer I am going to get is, well, they don't meet the TCC. The question that I am going to ask you is this...

Volume 62 was Monday, I think it was.

MR. WILSON: A. That's correct.

Q. The question is this: In terms of access to technologies such as solar technologies, apart from the TCC which we have discussed at some length, what is the test? I mean, sorry, what is the constraint?

If it isn't financial resources to assist in the market penetration of these things, is it that there is a lack of expertise in evaluating these

technologies within Hydro? is it, for example, a sense that some of these technologies are not ready? Is it a sense that you feel that the industry isn't able to meet increasing demand?

Is there some kind of a constraint that is not being identified clearly?

A. Well, you have given me a fairly good list to work with.

The first one - I don't want to disappoint you - it is the failure of solar technologies -- pardon me, of some solar technologies to prove to be economic compared to other options. That is the major stumbling block right now.

I don't think we are short of expertise to evaluate. I don't think we are short of funds to promote. The difficulty is that when we had a look at some of the flat plate collector kinds of solar technologies they just don't make it. It's not that we are convinced that that will never happen, but that's the situation at present.

We have just spent some time talking about instances where we are either acting on or anticipating acting on other solar technologies like the dimmable ballasts for daylighting controls, so that the solar technology territory is very broad. We are

active in some areas and have a watching brief on others.

I don't think there is a constraint.

Q. How many people do you have within Hydro who are actively working on evaluating solar technologies?

A. I don't know the answer to that question.

Q. Is there a department, is there a unit within a department, or do you have any knowledge of that?

A. Our research division has at least one person who is an expert on solar matters. I am sure that there are others as well.

MR. SHALABY: A. Our design and development division has a unit on alternative energy technologies. They are the people who guided the Panel, for example, through the Cortwright Centre.

MR. GRENVILLE-WOOD: Thank you very much. Those are my questions, subject to dealing with the June, 1991 report.

THE CHAIRMAN: On Monday. And if it turns out -- well, you won't know until Monday, but if you find out you don't need to ask any questions perhaps you will let Ms. Morrison know?

MR. GRENVILLE-WOOD: I will certainly do that.

MS. MORRISON: Would you like Mrs. Mackesy?

THE CHAIRMAN: Is she ready to go? All right.

Thank you, Panel.

MR. GRENVILLE-WOOD: Thank you, Mr. Chairman, members of the panel.

THE CHAIRMAN: Mr. Grenville, just hold on a minute. Ms. Patterson has a question.

MS. PATTERSON: I just wanted to follow up on the window film issue.

I had understood that there were some residential applications as well, but is it purely for commercial and industrial buildings?

MS. FRASER: Our current program applies to commercial/industrial.

MR. MacLELLAN: We aren't finding many applications in residential, the reason being in commercial you have cooling that's virtually all year round, whereas in residential it's for a relatively small part of the year, and it's also impacting on summer peak, whereas our concentration is more on winter peak.

MS. PATTERSON: Thank you.

THE CHAIRMAN: Any questions arising out of that?

MS. MORRISON: Mrs. Mackesy is on her way in.

[11:35 a.m.]

THE CHAIRMAN: In the meantime, Mr. Campbell, Dr. Connell has something he wants to take up with you.

MR. B. CAMPBELL: This is not my favourite part of every day.

DR. CONNELL: Mr. Campbell, it simply concerns Exhibit 309. I have spent a little time trying to -- 309, the title is "Incremental System Values of Power and Energy," dated August 1991. This is an update of 175, which is an update of 85.

I haven't spent as much time as I should have with this document, but I do see that there are some significant changes from 175, and I simply wanted to ask you if it would be expedient to explore these differences with Panel 4.

I think this is really more relevant to Panel 3, but I simply didn't want to lose Panel 4, in case you think there is expertise here that could guide us in interpretation of 309. If you think we should

wait until Panel 5 or some later stage, I'm happy to do that.

MR. B. CAMPBELL: Could I have just a moment?

Dr. Connell, this is obviously Mr. Shalaby's area. He was on Panel 3, and I believe he would be able to at least deal at a first level with your questions, particularly so if they were dealt with on Monday as opposed to today.

He's obviously been very tied up and would like to have the opportunity to review the exhibit, and then I would suggest that if you have questions for him, that he can deal with those as best he can. And if additional information is required, we will figure out how to deal with it then.

DR. CONNELL: Perhaps then I could just leave three questions with him to take up on Monday.

One is that I would just ask for a general commentary on the changes, highlighting the changes that have taken place from 175 to 309.

The second would be a specific one. That is to help us to understand the change in the formatting of the tables, and particularly the concept of life seems to have vanished from the tables. So, I'd like to know how we should deal with life in the U

tables.

The other specific is some general accounting for the differences in the magnitude of the values, and I'd like to understand whether Mr. Shalaby and others see these as trends which are likely to continue in future updates or not.

MR. B. CAMPBELL: Thank you. I'm sure Mr. Shalaby will do what he can to make sure he can discuss these things in a sensible fashion on Monday.

MS. PATTERSON: I guess this brings us to the general question of the other parties who might be interested in this update, and how we deal with updates generally when the evidence of a particular panel is passed.

MR. B. CAMPBELL: Well, this has gotten some interest. For instance, Mr. Mondrow has approached me this morning. He'd like some coordination between tables in 175 and this one. I'm going to find out how difficult that is for him.

I'd suggest if there are concerns in this regard, that at least in the first instance, if people can simply approach me or whoever happens to be here at the time, or drop us a note, we should be able to deal with it in the first instance that way.

If we need to take it further or put any

additional material on the record, then we can do so. It's part of, in a long planning proceeding, we can't pretend that the world isn't changing as we go through, and I think what you will see in terms of the overall impact is a sort of a comprehensive dealing with those questions in the reintegration of the plan. That's where we are looking to that to kind of say, okay, we have gathered up the accumulated changes, and here's how we see them kind of fitting together. I think that will give a better picture of that, and we understand fully that the later panels will be witnessing to that point.

MS. PATTERSON: Thank you.

THE CHAIRMAN: Ms. Mackesy?

MRS. MACKESY: Mr. Chairman, I have put together a package of interrogatory responses, and I have given copies to Ontario Hydro, and I will give -- the clerk has just moved out, can I just set them --

THE CHAIRMAN: Give them to Mr. Nunn, who is just behind you.

MRS. MACKESY: Thank you very much. And there are extra copies on the second table from the front for those who wish to follow questioning.

Could we begin with the interrogatory on page 1 of the package? It would need an exhibit

number, and I am not sure --

THE CHAIRMAN: We will wait until Mr. Lucas gets back, and we can put them in at that time. But you can go ahead and ask the questions, and when he get back, we will put the number in.

MRS. MACKESY: Good.

CROSS EXAMINATION BY MRS. MACKESY:

Q. The question was:

"How is demand management that is contemplated by Ontario Hydro in the Demand/Supply Plan different from the conservation of electric energy?"

And the reply was:

"Hydro's Demand Management Plan has objectives of load reduction, load shifting and peak clipping and conservation of electrical energy as one method of load reduction."

My first question is, what are the other methods of load reduction that are not mentioned here?

MR. WILSON: A. When this response was prepared, Mrs. Mackesy, the primary one that was under consideration was simple improvement of the efficiency of electrical use, as opposed to doing without the services that electricity provided. Since that time,

we have added, perhaps, another variation on this, which is switching to another fuel, where that is economic.

Q. I see. Thank you.

So, then your idea of conservation is doing without, it's not efficiency? Is that what I should take from that?

A. That is the distinction we are using, yes.

Q. Oh, fine. Very well.

If the electrical system were once again --

MRS. MACKESY: Excuse me, could we assign an exhibit number to this?

THE CHAIRMAN: We have a new 267 number.

MS. PATTERSON: 261, I am sorry.

THE CHAIRMAN: 261, I'm sorry.

THE REGISTRAR: 261, it will be 66.

THE CHAIRMAN: That's 4.29.1.

---EXHIBIT NO. 269.66: Interrogatory No. 4.29.1.

MRS. MACKESY: Q. If the electric system were once again in a situation of having surplus generation capacity, is the current Ontario Hydro approach to demand management something which could change to more openly promoting an increase in

electricity use?

MR. WILSON: A. I think there would be a yes and no answer to that question.

Q. Pardon?

A. I have to answer yes and no to that question. There is no doubt in my mind that we will continue to promote electrical efficiency, again passes this criteria of it is cheaper to increase efficiency than it is to provide supply.

There certainly are cases, if we had a surplus of generating capacity, when I'm sure we would again seriously consider promoting uses of electricity, where that use of electricity could be accomplished, at least for the period of the surplus, without raising the electricity prices to other customers. That is the approach we followed in the 1980s.

Q. If Ontario Hydro had not promoted increased electricity in the '80s, might we be in a better position today in that the customers might naturally have learned to live with somewhat less electricity?

A. I really don't know.

Q. The panel has spoken of a change in attitude and a change in culture being necessary to make demand management succeed. And we have heard of

how turning out lights in unused rooms is to be part of that change, and how use of clothes lines can be part of it. That washboards are out, and based on Monday's testimony, I understand that putting on a sweater and turning down the heat is out. Is that correct? Is that how you gauge the attitude change?

MR. MacLELLAN: A. That's a reasonable summary, for two reasons. The reason why we try to stay away from advocating putting on sweaters and turning the temperature down, is it goes against our basic strategy of reducing electrical use without affecting quality of life.

The other main factor, as mentioned by Ms. Fraser when she brought it up, was that those types of behavioural change actions don't tend to last very long. They can change very easily with the economy or with general public attitudes. We would prefer to pursue something a little more permanent.

Q. You have no program design which would encourage those attitudes to be more permanent?

A. You mean putting on a sweater to be more permanent?

Q. Yes.

A. I don't think we figured out how to do that.

Q. Does Ontario Hydro have a list of what it considers appropriate attitude changes? These ideas are coming out through cross-examination. Do you have a comprehensive list anywhere?

A. I guess if you took all of our literature and put it all together in one place, that would be a comprehensive list. But we try to take our literature and target specific areas; the appliance area, the lighting area, the thermal envelope area.

The comprehensive list is actually a little too large for general public distribution. It would run to many, many pages, when we present the idea, the rationale and the explanation as to how to implement that.

Q. Have you just compiled the ideas?

A. Well, most of the ideas, actually, most of the equipment and product based ideas, I guess, are in the PCRD. A lot of the general advice and behavioural change ideas we don't have all compiled in one place.

As I say, it is in virtually all of our brochures. One place where most of the ideas came out actually was a program we ran a few years ago, where we were trying to gather energy efficiency and energy saving tips from the general public.

[12:50 p.m.]

We thought we would try a different approach, other than Hydro says do this, Hydro says do that. We wanted people to be able to tell each other what their energy saving ideas were. We ran a contest to get people to send in their energy saving ideas and we got about 12,000 of them, and that pretty much covered the waterfront.

But we haven't retained them in any sort of comprehensive data base.

Q. Did Ontario Hydro agree with all of those ideas or did they find --

A. Oh, no, we didn't agree with all of them. We found some great ones and published them in a brochure that has been quite popular over the last few years.

We did find, however, we had to add a section to the end of the brochure that we didn't originally envisage and that was myths section. We found it amazing the amount of energy-use myths that are out there. My favourite example is opening your doors and windows for fifteen minutes each day because fresh air is easier to heat than stale air. I must have read that forty times. I am the one that went blind reading all those tips.

Q. There would be other reasons for opening the reasons.

A. Oh, yes, but it has nothing to do with the ability of heating fresh air.

Q. But with quality of life it would.

A. Yes.

Q. Would you have any list matching specific attitude changes to the elimination of specific supply facilities either present or contemplated?

A. Sorry, I don't understand the question.

Q. I am not sure how much you would get in demand reduction out of some of these specific attitudes. Can you say if these measures are carried out, we don't have to build this size of facility?

A. Have we tried to quantify the demand impact of these behavioural changes?

Q. Yes.

A. Some of them we have. Last year we ran a program for cold water rinse, for example, and we attempted to quantify the results of that behavioural change.

Some of the others that we advocate such as planting trees to shade your house, putting

evergreen trees on the northwest corner of your house, things like that, we have had conversations with our research division as to how to quantify those, and they haven't figured out a good way yet. They are just too variable.

Q. And there would be a time element involved in that?

A. Yes. There are some things that we can quantify. Clothesline use, for example, assuming we can make some assumptions as to how often and how completely people will do it. We can quantify that as to reduced dryer use and impact on demand. But I guess we are still trying to collect general public attitude and behaviour statistics so that we can try to quantify that, but it's so variable it's a real challenge.

Q. This has been partly mentioned in your previous replies, the question is who determines what are appropriate changes?

A. Appropriate in terms of demand reduction?

Q. Appropriate in terms of attitude change, yes.

A. I guess to some extent we do. I don't want to cast us as big brother, but we take a look at the variety of things people could do to reduce

their energy. I guess we apply some judgment as to which would affect quality of life in a negative manner and which wouldn't.

We also do a fair bet of public attitude research as to what people would accept and what they wouldn't, and how far they are willing to go and where the line is drawn. But it's very judgmental.

Q. Now, frequent mention has been made of an increased concern for the environment among the people of Ontario and various surveys are part of the exhibits for this panel.

I have some general ideas about what these surveys are based upon. When these surveys are taken with regard to electricity service, is there any description of what the respondents mean by the term the "environment"? I suppose I am also asking in relation to that, is the term "environment" suggested to the respondents and a certain description placed on that? Is the term "environment" something the respondent comes back with?

A. It's usually the latter. We try to rely more on what is called unaided awareness as opposed to aided awareness. We rely on the public's perception of that generally accepted term. We try not to define it for them.

Q. All right. You say the term is generally accepted. What is the meaning? Do you ask the respondents specifically what they mean by that or do you apply a meaning to it once it's used?

A. I can't remember a study in which we have asked people to define it.

Part two of your question, we haven't gone so far as to apply any specific meaning to it. We assume it means general concern for the state of the environment. But we really haven't gone any further than that. We have tried to administer things like the classified study that you have heard mentioned a couple of times, it's designed by the Electric Power Research Institute in the States, that gives a little bit of detail as to, within that questionnaire design, what people mean by it. That questionnaire is a very long questionnaire that asks a number of different attitude questions to get at the same thing. So, it will ask a number of environmental questions very specific. Do you care about your water quality, do you care about your air quality, in a number of different ways and tries to distill that down into something meaningful.

Q. I notice that in the interrogatory which mentioned that, the full survey was not included, there was only a summary of it. Would it be possible

for me to get a copy of the full survey?

A. Certainly.

MRS. MACKESY: Could I have an undertaking to that effect, please.

THE REGISTRAR: 267.26.

MRS. MACKESY: Thank you.

---UNDERTAKING NO. 267.26: Ontario Hydro undertakes to provide survey designed by the Electric Power Research Institute.

MR. MacLELLAN: You are interested in a full copy of the classified study, not specifically that interrogatory; right?

MRS. MACKESY: No, not the full interrogatory. There were many other attachments to that. Just the classified study.

Q. Now, when you are interpreting the term "environment" then, when you get this back, do you consider it -- you say it covers a wide range. You consider both social and natural aspects of the environment?

MR. MacLELLAN: A. I don't remember it in much that much detail right now, I'm sorry.

Q. Are people asked about their attitudes to specific impacts or location of impacts?

A. Not in a classified study.

Q. And are you familiar with other...

A. I am not familiar with any research that does.

Q. Then when you design programs or supply to meet environmental concerns, the choice of which concern is being met is being made by Ontario Hydro, I gather.

A. When we design programs to meet environmental concerns, is that what you are asking?

Q. I am going back to the idea that the people of Ontario are concerned about the environment, but what I am getting from this discussion is that this is a very nebulous idea. So, if Ontario Hydro is going to take the "environment" into consideration when designing the system, Ontario Hydro makes the choice of which aspects of the environment it's going to...

A. I can only speak for program design as opposed to system decisions on the supply side.

We don't design programs specifically to meet environmental concerns. We design programs to reduce the demand for energy which we know will result in some environmental benefits. We then sometimes, and hopefully on an increasing basis, use the information that consumers have about environment and their impact on the environment to increase the penetration of a specific measure or product or behavioural change we

are attempting to promote.

Q. You say you use the information the customer has, in that case are you using specific environmental aspects?

A. No, we can't really get that specific with our programs.

I believe I mentioned once that we can't say that if you install better windows, to pick today's topic, then you will be reducing this specific environmental concern.

We try to get an estimate of that impact because of what is on the system at incremental periods. Mr. Shalaby has discussed that a fair bit. So that gives us a good indication of the specific environmental benefit that will accrue.

But as I say, we have been struggling as to how to communicate that with the public so they will be more informed and have more incentive to take action.

MRS. MACKESY: I think we can break now, Mr. Chairman.

THE CHAIRMAN: We will break now until 2:30.

THE REGISTRAR: This hearing will adjourn until 2:30.

---Luncheon recess at 1:02 p.m.

---On resuming at 2:36 p.m.

THE REGISTRAR: Please come to order. This hearing is again in session. Be seated, please.

MRS. MACKESY: Q. Mr. MacLellan, before lunch you mentioned getting ideas about saving electricity from the public. Have you done surveys to find out whether people actually put those ideas into practice?

MR. MacLELLAN: A. We have done a couple of surveys, particularly in the lighting and appliance areas, to find out what their current practice is, but as yet we don't have more than one of those surveys so that we can do it comparatively.

Q. It is just in that one area that you have done that?

A. Yes. And actually, we haven't taken those surveys and compared them against let's say the TIPS brochure, for example, and found out how many people took advantage of them or put them into use that hadn't before. We haven't done that.

Q. In that survey would that report only what people say they do, or is there some technique for checking that behaviour answers the --

A. No, we have to believe them.

Q. Now, to finish this section of my cross-examination, would I be correct in saying that Ontario Hydro is interested in conservation as a demand management measure only to the point that it does not involve a change in lifestyle?

MR. WILSON: A. Yes, that's fair.

Q. Now, I would like to go on to a follow-up to some cross-examination of Mr. Thompson of the OFA, and this is from Volume 53 of the transcripts, and it is at page 9717, going on to 9718.

Now, Mr. Thompson placed a description of farm communities in southwestern Ontario to Ms. Mitchell, and he included in his description the following question. This is beginning at line 23 on page 9717:

> "Is it possible that if you did a similar test in a rural community in southwestern Ontario where subsidies, rebates and incentives are an accepted way of life, that's a farming community in particular, that 80 per cent penetration rate might be abnormally low?"

And I will place this question to Mr. MacLellan in place of Ms. Mitchell.

Leaving aside any dispute as to where southwestern Ontario is, are you aware that the system Mr. Thompson described is not universally accepted within the farming community and it is sometimes described or discussed as "paper farming"?

MR. MacLELLAN: A. I believe I have heard that expression, yes.

Q. Can you tell me how you heard it?

A. Through a cousin of mine who is a farmer, actually.

Q. Are you aware that it can be considered as a reaction to the desperate economic situations some farmers find themselves in, the situation that Mr. Thompson described?

A. Yes, I believe so.

Q. And that it can be considered different from what the culture of farming is, not actually the culture of farming?

A. Yes, from what I know of it.

Q. Now, I would like to go on to confirm three factors that Ontario Hydro takes into account in its demand management programs.

One that you take into account is customer choice; that's correct?

MR. WILSON: A. Yes, that's right. That

was tough.

Q. Sorry. And a second one is esthetics. I think, Mr. Burke, you spoke to those considerations in homes and offices as being important, and Ms. Fraser later added they were non-energy efficient considerations that provisions are made for?

MS. FRASER: A. Correct.

Q. And the third one is respecting a sense of privacy, and, Mr. Wilson, I believe you spoke to invasion of privacy considerations with regard to replacement of refrigerators?

MR. WILSON: A. Somewhat facetiously, but yes.

Q. Oh. Oh, well. Were you serious in considering invasion of privacy as a factor to be taken into account?

A. Yes, the main point I agree with seriously, yes.

Q. Thank you. Now, with respect to the invasion of privacy aspect, do you realize that a farmer living on the land and working with it can have an intense sense of privacy about that land and be very upset about Ontario Hydro coming onto it to build a transmission line? Should this be a question I should make to another Panel?

A. That's not an element of most demand management programs.

Q. No. All right. Well, I was going to bring that in -- I was going to bring that element in even though it wasn't demand management in asking a question about demand management programs.

Do you see any unfairness in the amount of choice being offered to the customer in whether or not to reduce demand and to what extent to reduce demand as compared to the lack of choice a person has with a transmission line being built across his or her property? I am not sure whether this question is appropriate for this panel or for a later one.

A. I think we are on record as favouring choice where demand management is concerned. No one here, to my knowledge, is able to deal with the other aspect.

Q. Okay. My next point is just a point of clarification regarding something which arose out of the City of Toronto's cross-examination.

Some questions were asked about deep lake water cooling as a way of cooling buildings in downtown, the downtown Toronto core. Is there a minimum depth of water needed for this technology to work?

MS. FRASER: A. I believe so because of the temperature that you want to bring the water in at, and I believe they're looking at quite deep in Lake Ontario to bring the water in. I could look up that number, if you would like.

Q. I would like that, yes.

A. Okay.

Q. I suppose that's another undertaking?

THE REGISTRAR: 267. --

THE CHAIRMAN: She's about to look it up.

MRS. MACKESY: Oh, I'm sorry.

MS. FRASER: 80 metres below the lake surface.

MRS. MACKESY: Q. Thank you. Mr. MacLellan, these questions arise out of some information you gave to the CAC, I believe, regarding an agreement between Ontario Hydro and Consumers' Gas for the Deep River project, pilot project.

MR. MacLELLAN: A. Yes?

Q. Ontario Hydro is contributing some money to help Consumers Gas bring natural gas to Deep River. What costs is that money to cover? Is that to cover conversion of heating systems within homes?

A. No, it's only to cover the extension of the main gas pipeline from the main trunk line that

runs a fair distance from Deep River into the Town of Deep River.

Any of the conversions of the homes in the Town of Deep River are to be the customer's costs or possibly a small incentive by the gas company, as they choose.

But our contribution is only for the pipeline, but the level of our contribution is tied to the number of homes that convert over the next five years.

Q. You mentioned being a fair distance from the trunk line. I don't need an exact figure. Could you say whether it was more or less than 10 kilometres?

A. Actually, I have no idea.

Q. Does Ontario Hydro have any concerns about the environmental problems arising out of gas pipeline construction and placement?

A. I don't know if that's been considered in this project.

Q. The next set of questions relate to demand management and transmission, and I will be using the interrogatory package again. So could we turn to page 5 of the package, please, and this is Interrogatory No. 4.29.10.

Could I have a number for that, please?

THE REGISTRAR: 261.67.

---EXHIBIT NO. 216.67: Interrogatory No. 4.29.10.

MRS. MACKESY: Q. Thank you.

My question was:

"Will transmission expansion be used to implement Ontario Hydro's demand management plan?"

And the response was:

"Demand management initiatives reduce load and so generally reduce the requirements for transmission facilities. A possible exception is noted in Section 3.4 of Exhibit 25, "Demand Management in the 1989 Demand/Supply Plan"."

Now, turning to Exhibit 25, page 45, Section 3.4 refers to load shifting causing problems on the distribution network.

Is there anyone here who can talk to this type of transmission problem, or even confirm that what I have said is correct?

Or should I leave this to Panel 7?

MR. SHALABY: A. Maybe you can ask the question, and we will see if it's within our expertise or not.

Q. All right. Am I correct in thinking that Section 3.4 problems relate to the distribution network rather than the transmission network? Or could there be problems on both the transmission and the distribution network arising out of load shifting.

A. My suspicion is most of it is going to be distribution or regional, regional transmission rather than local transmission.

Q. Okay. What sort of problems would there be on the regional transmission network?

A. Well, if, for example, an industrial complex would use a lot more electricity at night than they do in the morning, the facilities transformation and transmission lines to that industrial complex may have to be upgraded to carry more electricity than its usual peak, if you shift the peak to the nighttime and that peak is much higher than it was in the daytime.

I think it is sort of -- discussing that possibility, I am not sure whether in real life things like that do happen or the amount of shifting is that significant. I suspect that it is not common.

Q. Could it lead to a new line being built?

A. My suspicion, that the shifting is not going to be of such a magnitude in most cases. I

am not aware of any cases where load shifting made necessary the construction of new lines.

Q. Now, in the section immediately above 3.4, this is the Section 3.3.3, "Supply Management", on page 45, there is mention made of supply side load shifting options.

Hydraulic options are mentioned in the first paragraph. In the second paragraph there is mention made of pump storage, compressed air storage, and hydrogen storage being large supply options requiring the usual high capital investment, long construction lead time, and sometimes large environmental impacts.

Are these facilities that could require transmission out of them if they were built?

A. Yes, they would. If they were built, they would require transmission.

Q. These are described as "storage facilities". I gather they're not actually storing electricity at the point of use, just storing the potential to generate it quickly so it can be --

A. That's correct.

Q. And they might be quite far from the point of use in actual fact?

A. That's correct.

Q. Now, I believe the Panel has mentioned that interruptible load can have the effect of load shifting; is that correct?

MR. HARPER: A. It's not quite the same as load shifting. Essentially what you are doing is just peak clipping or reducing the load during the peak period. You are not shifting the load usually into the off-peak period.

Q. But the load could be shifted to another point within the peak period?

A. Yes.

Q. I got the impression from Mr. Wilson that it could be.

A. Yes, if the particular industry affected decided they wanted to make up production they could make it up at some point in time other than the month - it may be an off-peak period; it may actually be a peak period - at some other time during the month when the system wasn't in such a critical condition.

Q. Are there any transmission complications arising out of that?

A. No, there wouldn't be because in any circumstance the customer would be required to work within his existing contract.

Q. Going on to electrical efficiency

improvements, if they increase load might they require more transmission being built?

MR. SHALABY: A. The link between electrical efficiency improvement and increasing load?

Q. I am thinking of electrotechnology as an industry.

A. I think we normally speak of electrical efficiency improvement in the sense of reducing demand, but if there are technologies that increase demand there may be associated additional requirements for transmission.

Q. So, taking this together the load shifting and the EEI possibly increasing demand, there could be transmission problems or there could be new transmission required arising out of demand management programs?

MR. BURKE: A. Strictly speaking, there is a distinction we make between energy efficiency and electrical efficiency.

Q. Yes.

A. It's almost impossible that electrical efficiency will increase load. Energy efficiency improvements may lead to fuel switching into electricity.

Q. Yes?

A. But when we speak about EEI, "electrical efficiency improvement", that is almost unambiguously load reduction.

The distinction is between whether you are worried about the other energy forms and how they use energy and suggest that electricity is more efficient.

Q. Yes?

A. And that improves overall energy efficiency, but if you are restricting yourself to how electricity is currently used and making that more efficient, the result is lower load.

[2:54 p.m.]

So that in our EEI, as such, I don't see circumstances in which we would actually increase load. Previously in the '80s, when we had demand management to increase load, that was not electrical efficiency improvement. That was energy efficiency improvement.

Q. I think I'm probably missing part of that. So I'm not going to respond very well.

Perhaps I will move on to another interrogatory. Because I think that might have a direct relation to what you are saying, Mr. Burke. And this would be interrogatory 4.29.8, which is on page 3 of my interrogatory package.

THE REGISTRAR: 261.68.

---EXHIBIT NO. 261.68: Interrogatory No. 4.29.8.

MRS. MACKESY: Thank you.

Q. The question read:

"In the Demand/Supply Plan report, Exhibit 3, Ontario Hydro speaks of A) electric technologies that increase energy efficiency that may result in increased electricity demand."

On pages 7-2 and 7-3:

"And B) of electrotechnologies that are highly effective in helping customers manage their environmental responsibilities but may also result in increased electricity demand."

I asked whether these technologies were associated with the industrial or the commercial sector. Now before getting into the response to that, are you saying, Mr. Burke, that these technologies are not part of your Demand Management Plan?

MR. BURKE: A. Not part of the current one, no.

Q. But in trying to increase energy efficiency, if that is what Hydro is into now, then they are a part of Hydro's --

A. Electricity efficiency is a subset of energy efficiency. And the focus on the current plan is on electrical efficiency improvement. I think the only extent to which we have muddied the water on this is to say that to the extent that we have information about electrotechnologies, we may transfer that to customers who request that, and that may have the result that they apply it and increase load as a result.

But as far as incentives and promotion and so on, we are focusing only on electrical efficiency improvement and reducing the amount of electricity used in specific end uses.

Q. I don't want to argue this.

Now, just carrying on with that interrogatory, the response was:

"Yes, these technologies are associated with industrial and commercial sectors."

And I believe the panel has mentioned some industrial applications, but I don't recall commercial applications. I may have missed them. Could somebody mention the commercial applications, please?

MS. FRASER: A. There is a potential for

various types of heat pumps that could potentially improve energy efficiency but increase electricity demand.

Usually though what we encourage people to do is put a gas boiler on the back-up, and that deals with the peak issue. And then what you are able to do is move heat and cooling around within a building or from the ground into a building, and that avoids the increased electricity use problem. But there is that potential that we are very careful about when we provide information to customers.

Q. Now going on to Interrogatory 2.29.9, it's on page 4. Could I have a number, please?

THE REGISTRAR: 261.69.

---EXHIBIT NO. 261.69: Interrogatory No. 2.29.9.

MRS. MACKESY: Q. The question was:

"Do the users of these technologies generate their own electricity or are they supplied by Ontario Hydro?"

The response was:

"Most of the current and perspective users of these technologies are supplied by Hydro and the municipal utilities. Some may provide a portion of their electricity needs through cogeneration."

I just want to confirm that.

MR. SHALABY: A. That is the case, yes.

Q. Thank you. Now going back to my question regarding Interrogatory 4.29.10, that is Exhibit 261.67, I just want to confirm that there are situations within the demand management plan where new transmission may be required, depending on how it is implemented. That refers to load shifting -- I can take that out of the evidence that's just been given?

A. What do you want to take out? I am sorry.

Q. That some aspects of a demand management plan can result in new transmission.

A. I think what I agree to is that load shifting in some instances can result in regional and distribution requirements, additional region distribution requirements, and then he said if customers adopted electric technologies that increase demand, that could also increase transmission requirements.

The only point that flowed from that is whether electric technology is part of the demand management plan or not.

Q. If there were large-scale load shifting projects built, they could -- supply side

projects built, they could--

A. Yes.

Q. --use transmission. Thank you.

Now, I would like to turn to Interrogatory 4.29.13. This is on page 6 of my package. Could I have a number, please?

THE REGISTRAR: 261.70.

---EXHIBIT NO. 261.70: Interrogatory No. 4.29.13.

MRS. MACKESY: Q. The question was:

"Why are the expanded transmission areas required for implementing demand management plan not mentioned as shown and shown on the February 15, 1990 EAB hearing notice?"

The answer was:

"See the response to 4.29.10."

That response was that there generally wouldn't be any required. Taking the hypothetical that some might be required what is the situation, and should this question perhaps be directed to another panel?

MR. B. CAMPBELL: I think the details with respect to transmission facilities will be dealt with in Panel 7 which is focusing on transmission related issues.

THE CHAIRMAN: Yes, the questions here relate to whether demand management programs will lead to need for new transmission. I think that has been answered as best as the panel can answer it.

MRS. MACKESY: Thank you.

Q. I'd like to move to rate structures now. And that would involve the last two interrogatories in the package, Interrogatory 4.29.14 is on pages 7 and 8.

Could I have a number, please?

THE REGISTRAR: 261.71.

---EXHIBIT NO. 261.71: Interrogatory No. 4.29.14.

MRS. MACKESY: Thank you.

Q. And interrogatory 4.29.15 is on pages 9 to 12 of the package, but it already has been assigned a number, Exhibit 261.13.

First I will read the questions and then begin to deal with the response. The question in 4.29.14 was:

"Has Ontario Hydro considered a differential rate structure where an affordable rate is charged for basic electricity use and a higher rate is charged for use above the base amount with the aim of encouraging more

efficient use and reduced overall use of electricity. "

And the question in Interrogatory 4.29.15 on page 9 was:

"If Ontario Hydro has considered such a rate structure, please A) identify the studies or documents prepared by Ontario Hydro on the subject and B) summarize what Ontario Hydro sees as the benefits and drawbacks of such a rate structure."

Now, the introduction to the response to Interrogatory 4.29.14 reads, and this is on page 8 of my package:

"A differential rate structure that prices initial blocks of electricity lower than subsequent blocks is known as an inverted block rate structure. Hydro has considered inverted block rates during the course of the electricity costing and pricing study."

The initials E-C-A-P-S are given in brackets after the title of that study. Is that pronounced ECAPS?

MR. SHALABY: A. Yes.

Q. Thank you.

"This was published in 1976. No further consideration has been given to this approach to encouraging efficiency (demand management)."

And some reasons are listed.

The response to Interrogatory 4.29.15 on page 10 of my package begins:

"Inverted block rates were examined during the course of Hydro's electricity costing and pricing study ECAPS published in 1976. The ECAPS team analyzed the disadvantages which in its opinion outweighed the advantages and concluded that inverted rates were not an acceptable way to price electricity. All ten volumes of ECAPS' report are available from Hydro's public reference centre at 700 University Avenue, Toronto. The attached report entitled Lifeline Electricity Rates published by Hydro in 1985 examined the relationship between electricity and income, and this report also reviewed the U.S. experience with inverted (lifeline) rates."

Now, before going on to the advantages

and disadvantages of inverted block rates as listed in the answer to these two interrogatories, I'd like to go back to some testimony in Volume 60 of the transcripts. And this is at pages 10074 -- begins at page 10074 in Volume 60.

MS. FRASER: A. I am sorry, what was that number again?

Q. I am sorry, Volume 56, 10074.

THE CHAIRMAN: I don't think we have got to 66 yet.

MRS. MACKESY: 56, sorry.

THE CHAIRMAN: 56.

MR. HARPER: Yes, I have got that.

MRS. MACKESY: Thank you. Has the panel got the --

THE CHAIRMAN: That's all right, I will follow along here.

MRS. MACKESY: Thank you. I am sorry, I must have made a mistake in making out the list of transcripts to be used.

Q. Now I believe this was during cross-examination by Northwatch, and the question begins at line 6 of page 10074:

"Are you familiar..."

I am sorry, I will go back to the

beginning of the question at line 3.

"Now, Mr. Harper, I wanted to ask you some questions about your evidence about rate structures. Again I want to refer to British Columbia and what they have done. Are you familiar with some of the initiatives that they have proposed for there new rate application?"

Mr. Harper replied:

"Somewhat familiar with them..."

Then turning over the page to 10075, Mr. Greenspoon of Northwatch went on:

"My understanding is that British Columbia expects residential rates in the long run to move towards an inverted block structure."

Mr. Harper, my question to you is this is the type of structure which the answers in Interrogatories 4.29.14 and 15 refer to? That's the type?

MR. HARPER: A. Yes.

Q. I take it out of Volume 56, page 10075, that British Columbia is introducing these rates over a number of years, seven or eight years, in a multi-phase or multi-year plan?

A. Yes, that's the current proposal.

Q. Would you be able to speak to how they might be addressing the disadvantages that you have, or that Ontario Hydro has indicated in Interrogatories 4.29.14 and 15?

[3:10 a.m.]

A. No, not really, I am sorry. We just got the information on the British Columbia filing, I think within the last couple of months, and it is fairly voluminous. And pretty well what I asked my staff to do is go through it and just try and give me a brief precis of what was going on and they briefed me on the proposal. I haven't had an opportunity to go through it in detail myself.

Q. So you wouldn't know whether they see the same disadvantages that you have seen and whether they have worked out any way of dealing with those?

A. No, I'm sorry.

Q. Thank you.

A. I think I should maybe point out that that idea of introducing an inverted rate structure in British Columbia is still very much at the proposal stage. What they have done is they have submitted it to their regulatory authority for review and there will be hearings coming up over the coming months which will

be reviewed and then the regulatory authority will make their final decision of whether or not it should be implemented.

Q. I understand that.

Before going into the advantages and disadvantages that are listed in the interrogatory responses, I want to place one more question with regard to the evidence in Volume 56, and this is from page 10078, beginning at line 6. And it reads, this is Mr. Harper's evidence:

> "...B.C. Hydro is currently in the position where their estimates of their avoided costs are higher than their average costs and as a result... which is in contrast to where we are here in the sense of where our avoided costs are to some extent less than our average costs."

This was in response to the question from Mr. Greenspoon:

> "Why would an inverted block rate structure not contribute to the overall thrust of Ontario Hydro's conservation program?"

Now, Mr. Harper, could you briefly restate that reply in words that would be clear to a

member of the public who hasn't been able to attend these hearings? Maybe I can give you some leading questions.

A. To someone who hasn't sat through all of Panel 3, I guess.

Q. Yes. That's right.

You speak of Ontario Hydro's avoided costs. In this context, in the context of that reply and with reference to the British Columbia Hydro situation, what relation does that have to the building of new nuclear generation in Ontario?

A. I guess when I was responding to the question here I was trying to give some of the underlying rationale as to why B.C. Hydro was doing this. My understanding is, in their particular situation right now, if you look at their average rate levels and if you look at what is considered to be the cost of, say, new supply, that's another way of trying to explain avoided cost.

The cost of new supply is higher than their average cost or the current rates, and this is typically one of the rationales used by the people who are going to be introducing inverted rates, as to why you would want to do so.

In contrast to that here, I think you

have seen in the discussion that's gone on both in Panel 3 and this panel, our avoided costs are currently add or actually probably slightly below our average costs, so that particular element doesn't exist here as it does in B.C.

I think the other thing which I probably didn't respond to at that particular point in time is the whole question as to whether inverted rates actually do encourage conservation. I think to some extent the jury is still out on that, even after they have been around for 10 years. I think that is probably what we will get into when we talk about the advantages and disadvantages, yes.

Q. Yes. Thank you very much for that explanation. I think that's going to be helpful. There is just one more question I have regarding that, regarding the avoided costs in Ontario. What relation is there between the avoided costs in Ontario and the building of new nuclear supply?

A. As Mr. Shalaby was explaining this morning, the costs of building nuclear supply are part of what is reflected in overall calculation of avoided cost. I guess, that's how I see the relationship between the two.

Q. Now, could we turn to the

interrogatory package, please. Turning to page 8, which is an interrogatory response 4.29.14.

Q. I am going to lead you through the list of disadvantages first and place some questions.

A. 4.29.14?

Q. 4.29.14, yes. Which is page 8.

And here it explains why you hadn't considered the inverted block rates further.

The first point is, and I will read all the way through it.

> "Inverted block rates were rejected by the Ontario Energy Board in HR 5. The Board noted that, "rate-making aimed at income redistribution...would be contrary to the principles of fairness and would distort cost-tracking. If electricity rates based on costs should prove to be burdensome to low-income customers, redress of any imbalance is the responsibility not of Hydro but of government... Departure from cost-based rates would be unjustified and could lead to major inequities."

Now, with regard to the idea that rate-making aimed at income redistribution would be

contrary to the principle of fairness, what do you mean by aimed at income redistribution?

A. I think this focuses on the idea that was in the original interrogatory question about pricing the initial block of electricity at "an affordable level", the idea being that through pricing at an affordable level you are providing some social assistance with the idea of social assistance to customers in the first amount of electricity that they use.

Clearly, if you are pricing electricity below cost for those people and they are paying less than cost, and you are making it up, basically making up your revenues from other customers, then by the fact that you are pricing differently, you are essentially redistributing income between those customers, because they aren't having to pay through their rates. They basically have more income to keep whereas other people that have to pay more through their rates are giving up more income. So, basically, you are using electricity for income redistribution.

Q. That would apply only if that first block were based below cost?

A. Yes, that's the idea, yes.

Q. If it were based at cost, that

particular objection would not apply?

A. Yes, I think that's a fair statement.

Q. All right.

MS. FRASER: A. Our current rates are at cost.

Q. Yes.

You mentioned that if electricity rates based at cost should prove to be burdensome to low income customers, redress of any imbalance is the responsibility of Ontario Hydro and not of the government.

THE CHAIRMAN: I think it is the other way around.

MRS. MACKESY: I'm sorry. Not of Ontario Hydro, but of the government. Thank you, yes.

Q. Do you see inverted block rates as based on cost? What connection do you see between cost and inverted block rates, or can there be a variety of designs?

A. I guess there can be a variety of designs. There can also be a variety of reasons as to why people would implement them in the first place. I think probably part of the issue is they are implemented in different jurisdictions for a variety of reasons, in many places they are implemented as a form

of social assistance, or to try and provide affordable -- the idea is to try and provide what is seen to be affordable electricity for basic use.

I think there are some fundamental problems with that which I think the second interrogatory response tries to address somewhat.

But I think the idea is that if the objective of introducing it is to try and get at social assistance or income redistribution, really I think what the OEB was saying here was doing that through electricity rates is not the appropriate way to do it. There are better mechanisms than that.

Q. The last sentence in that point was: "Departure from cost-based rates would be unjustified and lead to major inequities."

Could you speak to that, please?

A. These are the OEB's words and not mine. So, I would be, to some extent, trying to read into it what they mean.

Q. I won't ask you to try and second guess the OEB on that.

Would you, in your position, consider this a ...

A. I think if your idea was you are implementing this for purposes of lifeline rates or

social assistance then I think the answer would be, yes it could lead to major inequities, simply because, I think as I indicated in my direct, probably poorly because Mr. Campbell had to correct me in the end, that basically low income people do not necessarily use less electricity.

You also find low income people that also use fairly large amounts of electricity. This can be because they live in, say, poorly insulated houses, or because as Ms. Fraser was talking about, when they are looking at capital expenditures, they are looking at lowest first costs, which often may be an electric heating system. So that if you were trying to get at these, what may be viewed as social inequities through electricity pricing, then you really aren't going to solve the whole problem. As a matter of fact, you may be penalizing a good part of the population that you are trying to assist.

Q. To speak to your particular example of poorly insulated houses, could you then combine rates and incentives as a measure of demand management, incentives to improve insulation to reduce demand?

A. I think probably the incentives are the better approach of the two. I think you would be getting directly at improving the electrical efficiency

and you would be getting at upgrading the insulation specifically and getting at that specific root of the problem.

And also when you are finished the whole thing, they would be paying lower bills because their houses would be better insulated.

Q. The second point:

"Hydro's mandate, established in the Power Corporation Act, requires the corporation to price electricity at cost (PCA Section 75). Inverted block rates deviate from the cost-tracking objective."

Do you want to say anything more about that?

A. I think the statement is pretty clear the way it is.

I think in a lot of jurisdictions, and I think this is common not only to Ontario and a lot of jurisdictions that have implemented these rates, when the utilities have been asked subsequently, how do the rates match with their costs, there really is not much link between the two.

I think part of the reason for that is, is because they have, in designing the rates, tried to

incorporate some of these social assistance objectives as well and in doing that you end up departing from cost.

Q. Point 3 was: "Determining an ""affordable" rate level and a "basic" level of electricity use is extremely difficult."

Has Ontario Hydro given any consideration to determining a basic level of electricity use?

A. I guess, no, we haven't.

I think if you will look at the material that we have filed in conjunction with the second interrogatory, that's 4.29.15, we presented some analysis there trying to explain the level of electricity consumption within a household and demonstrating that there are a large number of parameters that contribute to that. And so trying to define, basic use can involve such things, or be related to such things as the size of the house, the number of occupants in the house, the climate the house is located within.

Often again, in other jurisdictions that have implemented these rates, this is another problem that they had in trying to define what is your level of basic use or affordable use. Frequently one of the

problems is, once you define a level, there is often a clamour for many people that the level is too low, and so the pressure is often to move that level up. It's never to move it down.

Q. Does this disadvantage relate to arguments about what the difference is between wants and needs as related to electricity demand?

A. I think it is very much the same thing, yes. I think to some extent wants and needs are very much in the eyes of the beholder.

What I view I want as opposed to need may be different than somebody else would view I should be wanting as opposed to needing.

Q. And has Ontario Hydro taken the approach that any want for electricity is a need if the person is willing and able to pay for it?

I took that out of Mr. Wilson's remarks in Volume 48, at page 8779.

[3:35 p.m.]

I am having some difficulty because I can't find that myself. Oh, here it is. Sorry. It's page 8779. It runs from lines 2 to 13.

Mr. Wilson says that:

"I think my point is different.

There is a distinction between not

wasting a valuable resource and being entitled to receive whatever you are prepared to pay for. So the notion of conservation or efficiency is that if you are looking for a comfortable living room to sit and read the paper in in the evening you are entitled to that as long as you can afford it. If we can use programs to make it cheaper for you to do that at least we would get the service need -- satisfy that service need and that is what our programs are all about."

So to repeat the question: Has Ontario Hydro taken the approach that any want -- or electricity is a need if you can pay for it?

MR. WILSON: A. I don't believe we take a position on the morality of people's preferences for what they do with their money. Consequently, if they are prepared to pay for electric service we don't question their wisdom in doing so.

MR. B. CAMPBELL: Mrs. Mackesy, if it's of any assistance to you, I think I have made it clear in the argument of some of the motions that preceded the commencement of the hearing that it is Hydro's position that the Power Corporation Act, the statute

itself, places upon Hydro a positive obligation to serve, and I think that's just another dimension of your question that I think I want to be clear that we have taken a position on as to what the statute requires as well.

MRS. MACKESY: Thank you.

Q. Where does this currently leave people who have wants for electricity service but can't pay for them? Or are there "wants", not "needs"?

MR. HARPER: A. I think people have wants for all kinds of things that they can't pay for. Now, it really isn't Ontario Hydro's business to address that problem.

Q. Now, I am going to place this question in view of what Mr. Campbell has just said. You may not be able to comment on it.

Does it mean that those who have been able to pay for more and more electricity are entitled to it even though supplying those wants has an adverse impact on others?

A. I think that is a correct interpretation or one way of saying what I think I have just said.

MR. B. CAMPBELL: And again, Mrs. Mackesy, I would point out that there are a whole set

of legal processes, these hearings being one of them, that mean that putting in place those facilities is not a decision that can be taken by Ontario Hydro alone.

There are these kinds of processes, and before any capital facilities are committed there is a requirement under the Power Corporation Act to obtain an Order in Council. So those, also those legal requirements, come into play.

MRS. MACKESY: Q. So, one is not able to raise as an issue at this hearing then whether or not we are wasting electricity resources?

MR. WILSON: A. I think that's a very reasonable question to raise. The question I think that you asked is: Is it Ontario Hydro's business to supply or make decisions about whether or not supply that is requested or demanded by customers can be -- should be supplied when there is an adverse consequence for someone else?

And I would think that almost every element of electricity supply from the first day in Ontario has affected someone adversely to someone else's benefit. I think there is always an exchange of benefits and costs. It is generally the laws of the land that try to restrict sort of undue adverse effect on -- by any one group or individual.

Q. Going back to the question I just placed though, regarding whether or not we are able to raise as an issue here the wasting of electricity and resources, and did I interpret you correctly as saying that was a reasonable question?

A. Yes, that's right. I think the thrust of all of our demand management programs--

Q. Yes.

A. --reflects a judgment that --

Q. But you have the limitation that if someone expresses what they call a need for it, then that is to be supplied?

A. Yes. If they're prepared to pay for it.

Q. Yes. And then someone else's interpretation as to whether or not it is a need is outside your consideration?

A. The trivial example was, you know, a warm living room to sit in and read your paper. If you can afford to pay for the heat and have a living room to sit in and a paper to read, then that's I guess your right as a citizen.

If we can make it cheaper to keep that room warm through our programs, that's certainly what we are setting out to do, and if in the process we can

reduce the amount of waste involved that's very much the heart of our programs.

Q. But you would not encourage people to put on a sweater and reduce the heat. You think that's too much to ask the people of Ontario to do?

MR. MacLELLAN: A. We do ask them to reduce heat. That's in most of our literature. We haven't yet asked them to put a sweater on.

Q. But that could reduce more, the need?

A. Yes.

Q. Now, going on to the fourth point then in -- well, just coming back before I move on to that.

You aren't thinking of increasing rates as a way of stimulating people to put on a sweater to reduce or turn down their thermostat?

MS. FRASER: A. I think my example the other day probably would have been better phrased that we are not going to ask people to freeze in the dark.

Q. No, I am not suggesting that either. But there is a gradient in between?

A. Yes, there is, and I think it's a very difficult notion. We are certainly encouraging people to save energy and make more efficient use of it and avoid wasting it where they can.

Q. Before moving on to my next point could I return to you, Mr. Wilson, and this is in connection with Volume 48, page 8779 that we have just been looking at.

This is at page -- and this is at line 6 and 7: So the notion of conservation or efficiency...

I gather there you are using them as synonyms, whereas I gather from the answer to my first interrogatory this morning that you do not see conservation as efficiency but you see it as reduced demand?

MR. WILSON: A. You are right. I was inconsistent here.

Q. Okay. Now, finally, going on to point 4 on page 8 of my interrogatory, the last point in interrogatory response 4.29.14.

It reads:

> "Charging higher rates for electricity use over some base point assumes some value judgment about the "proper" level of use. However, large users are not necessarily inefficient (one implication that stems from inverted rates). For example, a large steel mill producing the same level of output as two

small steel mills should not unnecessarily ... penalized simply on the basis of its size."

My first question is: Does the reverse now happen? I mean, do large users pay less than small users?

MR. HARPER: A. No, our industrial rates are the same regardless of size. They are the same demand charge that's applicable and the same energy charges that are applicable over the different time periods: winter/summer, day/night. I think --

Q. Excuse me. Just to follow up on that, as they use more and more are there blocks so that as you get into a higher use the rate per unit is less?

A. No, I think the easy answer to that is "no". For our industrial customers there is one demand charge for each of the winter and summer and one energy charge for each of the four periods, and that charge applies regardless of whether you are taking 5 megawatts or 105 megawatts. There is no blocking.

For customers below five megawatts, if you looked at the rate structure initially you would think there was some blocking going on because if you look at the rate structure you see the energy charges

are going down, but really, the reason that is happening is because we are at certain points in time introducing a demand charge at the same point in time.

For very small commercial and industrial customers we don't have any demand charges at all. It's a straight energy rate. It makes the metering easier. You just have to have an energy meter on that customer.

Once you get over 50 kilowatts though we introduce a demand charge. Once you decide you are going to collect some of your revenues from a demand charge in order to collect the same amount of money let's say on average per kilowatthour from the customer you are going to have to reduce your energy charges.

So, there is a blocking that takes place there, but the blocking is really to recognize the fact that you are introducing a demand charge and now getting part of your revenue from that customer through a demand charge as well as some of it through an energy charge.

Q. So, what you are saying is that larger customers are not getting a cheaper -- larger use customers are not getting their electricity at a lower --

A. No, I think typically what happens,

and there was some discussion of this last week, I believe, is large customers because of the large supply they are taking are usually taking it at high voltage, say 115 kV or even 230 kV.

They will then own the subsequent transformation facilities. Because they own those transformation facilities and we don't have to basically pay for them, and install them, and construct them they are given a lower rate which is basically a cost-based rate, reflecting the fact that we don't have to provide those facilities.

It's those same types of customers that are buying at that point. You talked with Mr. Shalaby about if they shifted their load around, you could find there being some impact on say the regional supplier or the local transmission system.

Q. Now, this response introduces the idea of the large should not be penalized simply because they are large, and I want to go, Ms. Fraser, to your description of some - and Mr. MacLellan - of some demand management measures, and, Ms. Fraser, you mentioned customer audits for 200 large industrial customers, including in some cases assigning Ontario Hydro staff to the actual company; is that correct?

MS. FRASER: A. I talked about a

customized approach to the largest 200.

Our audits in both commercial and industrial, we have a process called power saver audits. They're open to any of those customers. In addition, any industrial sector where there are complex processes we will also fund consultant audits to be done. So they're not restricted to the large 200. It is just that those large 200 are very easy to target as a marketing service.

Q. They're getting a more customized service than --

A. Pardon?

Q. And they're getting a more customized service.

A. Yes.

Q. And with regard to large farms, Mr. MacLellan, I think you mentioned -- or I am not sure whether it was you or not. I mentioned that there were 1,700 large farms, each with use over 10,000 megawatts per month that were being given --

MR. MacLELLAN: A. No, I don't think that's --

Q. Perhaps that was Ms. Mitchell then?

A. No, the 10,000 megawatts, I believe...

Q. 10,000 kilowatt hours per month?

A. Yes, that was Ms. Mitchell's testimony.

Q. Sorry. And based on Exhibit 190, page 7, which is an extract from the 1990 Ontario Hydro annual report I think that indicates that there are 105,000 farms in Ontario; is that correct?

A. Yes.

Q. So that 1,700 is a very small portion of that amount?

A. Yes, it is.

Q. Now, based on that, my question is: Are large industrial users and large farm users being given a competitive advantage not being given to smaller industries and smaller farms?

MS. FRASER: A. I have already clarified that with respect to industry. They all get audits.

Q. But are the larger ones given more?

A. No, it's just a matter of our marketing technique.

Q. Better quality?

A. No.

Q. They're not?

A. No.

MR. MacLELLAN: A. The large farms are

given access to this formal farm audit process. The smaller ones still have access to our Energy Management representatives in the areas who, upon request, will do work on the farms and give them advice as well.

The large farms are much more similar in operation; therefore, the farm audit program has been designed with those similarities in mind.

[3:40 p.m.]

It is difficult to take a small farm operation and fit it into this audit package and make it make sense. I believe that is the only reason why there is a cut-off point.

Q. But the large farm audits are being given a more comprehensive survey of their energy use?

A. It is probably slightly more comprehensive, yes.

MRS. MACKESY: This would be a good time to break, Mr. Chairman.

THE CHAIRMAN: How long are you going to be? I was told you were going to be an hour.

MRS. MACKESY: That's what I thought I was going to be, too, but this rate section has taken much longer.

THE CHAIRMAN: Pardon?

MRS. MACKESY: This rate section has

taken much longer than I anticipated.

THE CHAIRMAN: How much longer do you think you will be?

MRS. MACKESY: I was going to work through the advantages and disadvantages in the second section.

THE CHAIRMAN: It is the same subject, isn't it?

MRS. MACKESY: Yes.

THE CHAIRMAN: It is block rates. So perhaps if it is only going to take you a few minutes, we could continue and stop then.

MRS. MACKESY: All right, then we will do that.

Q. Could we turn to page 10 of my interrogatory package then?

Mr. Harper, are you familiar with the disadvantages as listed on pages 10 and 11 in this response to 4.29.15?

MR. HARPER: A. Yes. I think the attempt here was to try and draw on the work that had been done in that electricity costing and pricing study, and try and extract from that view what we saw, what had been listed there as the advantages and disadvantages.

Q. Is there anything in the disadvantages as listed here which you haven't touched on before that --

A. I think we have talked about No. 1.

Q. Yes.

A. We have talked about No. 2.

Q. May I just ask one further question with regard to No. 2? Has Ontario Hydro done -- I will read the point:

> "Inverted rates may not incur each conservation. These rates decrease the incremental price to consumers whose total demand is less than the inversion point. That is the incremental price to low income customers would be reduced and these customers would be encouraged to consume more electricity, while large customers would be encouraged to reduce consumption. The net effect on a given class would depend on which of these effects dominate."

My question on that is has Ontario Hydro any studies on electricity use by varying degrees of income? Not just by high and low but across a more finely divided category of income -- categories of

income?

A. I think about the only work to my knowledge that we have done, and maybe Mr. Burke has done some work in the forecast area, in terms of looking at the effect of net income and energy consumption is the particular work that is attached to this interrogatory response.

Q. Point 3 reads:

"Low electricity users, for example, predominantly natural gas customers with higher incomes cannot be excluded from such a program. If these customers demands were below the established basic level, they would be incorrectly subsidized."

Is that another difficulty to be overcome in establishing a basic level of electricity service?

A. Yes, I think that is the flip side really. We were talking earlier about the fact that if you were trying to use this as some form of social assistance, then there may be certain customers you may miss. The flip side of that is there are probably certain high income customers who will be below that basic use.

Q. And was there anything further you

wanted to add to point 4, page 11?

A. I don't believe so, no.

Q. Now going on to the advantages which are listed on page 10, and you mentioned three of them, are there advantages of inverted block rates in the first point mentioned in this response to 4.29.15 is:

"Consumer groups could support a proposal which reduces electricity prices to low income families."

And what do you mean by that?

A. I guess what we are trying to capture here is the fact that if you think about it just off the top of your head at first blush, you know, trying to provide affordable electricity to people who have low income seems like a good thing to do, you know. I think that was the idea. Whether or not you actually get the target group that you are trying to get is one of the disadvantages, so that it may be an objective. It may be laudible. Whether or not you can actually achieve it is the problem.

Q. And Ontario Hydro hasn't tried to work out to that?

A. I think what we have done is we have done some analysis trying to see to what extent you would achieve it. I think if you look at the same

report, you will see that analysis done on other jurisdictions has also tried to see whether or not low income people consistently use less electricity, high income people more, and the results are that other jurisdictions are generally consistent with ours, and that is that there is no clear demarcation.

That even if you look at more recent data from our residential appliance survey, which basically collects not only appliance ownership but also electricity use and also information on income levels, you will find that the same position still holds. There are a large percentage of low income people who use more than the average amount of electricity in the province.

Q. So, it comes back to the question of setting the basic amount.

Now the second point was:

"Inverted block rates are easy to understand."

Could you elaborate on that, please?

A. Well, I think again there is a trade off here. If you will look at a fairly simple rate structure with one inversion point, it is fairly easy to understand.

What frequently happens in many

jurisdictions is, in trying to get at this affordable issue, they introduce other factors into it, such as maybe the size of the household or the climate zone or whatever. Once you start to do that, the rate structure obviously becomes much more complex. So what you start off with as being a fairly simple idea, sometimes in order to try and make it effective it becomes too complex, even too complex to administer.

I think if you read the report we filed, the note made in there was that California had actually gone from a really complex approach, trying to simplify it down because they found the approach they were taking was too complex, and they had to simplify it in order to make it administratively practical.

Q. But that can be done. You seem to have a fairly complicated rate structure now, as I have been difficulty trying to follow what --

A. Well, I guess the one we now have has two blocks, just like this one has two blocks. So I'm not too sure whether it is any more or less complicated.

Q. Point 3:

"Depending on the basis for setting the end block rate, inverted block rates could encourage demand management."

So you are admitting in that, I gather, that they could in some aspects encourage demand management?

A. I think to a large extent the jury, as I said, is still out on this. There is, to my knowledge, there hasn't been any distinct analysis that has demonstrated that it succeeds encouraging conservation or that it doesn't.

There was some work, there was some survey work that was done by B.C. Hydro in preparation for this particular filing that they did, where they went out and surveyed jurisdictions that were applying inverted rates, and really none of them had any concrete evidence to offer in terms of whether or not those inverted rates had encouraged conservation or hadn't encouraged conservation.

So, I think the issue is we don't know, and it is partially a function of the fact, as we said, some customers will face higher rates, some customers will face lower rates. And typically what happens is, as we noted earlier, the pressure is always to push the inversion point up, so you get more and more customers facing the lower rates as opposed to the higher rates.

Q. From your resurvey of the literature that you have received at the British Columbia project

proposal, do you know whether they see any additional advantages which you haven't listed here?

A. No, I don't.

Q. Would an additional advantage of the inverted block rate structure be that it would still allow people to choose which type of electricity use reduction they wanted to make? I'm thinking in terms of their personal life.

A. Sorry, I think they have that choice right now. I'm not too sure how moving from what we have now to this structure would either improve or --

Q. If you were to take it that there was a demand manage -- that it could reduce demand, it would still have a choice within that to choose how much.

A. Yes, they have that choice now, too.

Q. Yes, I see what you mean by that. But if you were to take that this would bring about a reduction in demand, you wouldn't be taking away the choice that they now have.

A. I think the care you would have to do in that is the extent to which you actually physically increase the rates. You can say they have a choice. The rates are increased too much, I think you get to the point whereby people's choices become particularly

limited.

MRS. MACKESY: I think those are all my questions, Mr. Chairman.

THE CHAIRMAN: Thank you, Mrs. Mackesy.

We will take a break until 4:00.

THE REGISTRAR: Hearing will recess until 4:00 p.m.

---Recess at 3:50 p.m.

---On resuming at 4:05 p.m.

THE CHAIRMAN: Please be seated.

Mr. Rosenberg?

MR. ROSENBERG: Thank you, Mr. Chairman.

THE CHAIRMAN: We have once more been unsuccessful in having a ten minute break.

MR. ROSENBERG: Mr. Chairman, just to give you some idea where we are going, I believe the rest of our cross-examination will take no more than one day, and we will finish on Monday. There is a number of issues which I'm sure I can cover within the next 55 minutes.

CROSS-EXAMINATION BY MR. ROSENBERG:

Q. The first one is related to Exhibit No. 24, and as well we might need Exhibit 260. But the first series of questions deal with Exhibit 24, and I'd like to ask a member of the panel, I'm not sure who the

best person would be, possibly Mr. Wilson or somebody else, just to describe what Exhibit 24 is, so that the panel and I have some background on this particular exhibit, it's purpose and it's use in these hearings.

MR. WILSON: A. Exhibit 24 is a study prepared for Ontario Hydro by RCG/Hagler, Bailly in July of 1989. The study was commissioned to provide Ontario Hydro with some benchmarks against which our targets could be both qualitatively and quantitatively compared.

The comparison they were asked to undertake was to deal with approximately 50 electrical utilities in the United States and Canada that were active in demand management and consequently would be the appropriate ones for comparison.

They were asked to look at a number of things: The savings that those utilities were planning on against what would be equivalent to the basic load forecast that Ontario Hydro has; the amount of market penetration they were hoping for; the timing, timetable for that work; the size of the budgets that they were dedicating to demand management; and the balance of efforts across the residential, commerce and industrial sectors; and finally, to the extent possible, within this context of this work, to give us some suggestions

for lessons that they think that we could profit from, other utilities had learned.

Q. Mr. Wilson, from my review of the exhibits that have been filed to date, it appears to us that this was the only review undertaken of Ontario Hydro's entire demand management plan in relation to DSP and what other utilities do.

Would that be a fair characterization? And I realize a lot of things have changed since 1989.

A. It's the only study which compares the targets. There are lots of studies that have already been filed, where we take a much more detailed comparison on a sector by sector basis, because each of those studies had much greater depth than this one. But this is the only one that looks at the highest level across, the overall.

Q. There are a couple of points from this plan that I'd like to look at. There are a couple of points with respect to this Exhibit 24 that I would like to look at, because of the assumptions that were made when preparing Exhibit 24.

If you could turn to page 5, and this page 5 is called "Classic Taxonomy of Load Shape Objectives."

[4:10 p.m.]

And of particular interest to me is the one marked "strategic conservation", and the fact that the only arrow going to the strategic conservation is efficient end-use technologies.

Now, could you first, Mr. Wilson, describe for us what page 5 is attempting to classify and what the importance is of load shape objectives?

A. The consultant has offered to us, just so we can readily understand the frame of reference they were using when they contacted the other utilities, to look broadly at what load shape objectives were and how they relate to demand management in general. There are six load shape objectives and they were defined a few years earlier by the Electric Power Research Institute as a way of developing some sort of common terminology so all the utilities across the United States could discuss this without having it be too confusing.

The top part of that page, in the smaller boxes, they have shown a number of, I think, examples of ways in which these load shape objectives could be accomplished. It certainly in my mind is not an exhaustive set of measures that one could take to achieve each one of those outcomes. That page wouldn't be big enough.

Q. To understand the strategic conservation, I take it what you are doing is just reducing the entire load on Ontario Hydro during all times of the day, or whatever the system of measurement is, just total reduction in electricity load.

A. That's the general sense of it. That doesn't exclude measures like air conditioning that would only reduce summer loads, or electric heating system improvements which would only reduce winter loads. But clearly the purposes is not decrease it at some times increase at others. It's a general reduction, and across all the measures you could undertake, you would have an overall reduction.

Q. Now, in Exhibit 260, slide 3, which were the overheads used for this panel, I want to compare the terminology used on that page to this page.

A. Yes, I have that now. Thank you.

Q. I am looking at page 3 of Exhibit 260, and it appears the first priority listed is under demand management objectives as load reduction, and Ontario Hydro's incentive program is electrical efficiency improvements.

Now, are those two terms synonymous with the two terms on page 5 of Exhibit 24? Is load reduction synonymous with strategic conservation?

A. Yes, it is.

Q. Electrical efficiency improvements is synonymous with efficient end-use technologies on page 5?

A. I think we could find minor areas where there probably would be caveats, but that's generally correct.

Q. Now, I would like you to turn to page 12 of Exhibit 24. Page 12 it lists a key to codes and notes, and you will agree with me that on the right-hand side of page 12, code No. 4 is strategic conservation; correct?

A. Yes, it is.

Q. Just keeping 260 in mind, the demand management objectives listed on page 260 are in a priority, are they not? In fact, load reduction is Ontario Hydro's No. 1 priority?

A. I couldn't characterize them as being in priority order. Well, they are fairly close to that.

Exhibit 260, the page showing demand management objectives are generic objectives which are an attempt to capture the same things that Hagler, Bailly has put across the bottom of the page They are objectives not of Ontario Hydro but rather objectives

that electricity utilities talk about when they talk about demand management.

Q. Is load reduction, if not exclusively the first priority of Ontario Hydro with respect to load shape objectives, at least in the top category?

A. It's the one that offers the greatest savings, so we listed it at the top, yes.

Q. If you then turn to page 11 of Exhibit No. 24, it's called respondent characteristics, public and Canadian utilities. They have listed load shape objectives and they have Ontario Hydro listed under Canadian utilities, right under 52, they have Ontario Hydro listed. And load shape objective No. 1 they have listed as one, to find out what that is I believe you go to the code on page 12, and that's peak clipping. The second objective is 2, load shifting, and the third is valley filling. And you would agree with me that no where on that chart when it talks about characteristics for load shape does it list strategic conservation?

A. Yes, I quite agree.

Q. Let's just look at this chart again, page 11, at the top. I am correct in characterizing these numbers at the extreme end of the row as load shape objectives; correct?

A. Yes, that's right.

Q. And No. 1, under load shape objective is first priority, No. 2 is second priority, No. 3 is the third priority; correct?

A. That's my understanding, yes.

Q. Now, what I would like to do, Mr. Wilson, is try and reconcile the assumptions made in this report about Ontario Hydro's load shape objectives with Ontario Hydro's priority, demand management being the first priority of Ontario Hydro, and load reduction being its number one demand management objective.

A. I don't think there is any difficulty here. I would simply think the consultant's report is wrong.

Q. So, do I take it then that their assumptions then at least under load shape objectives are wrong?

A. Yes.

Q. There is one other part I would like to look at, page 89. Actually, if we turn to page 88 of this report, it says "Interpretation of Findings". I am looking at page 88 of Exhibit 24. It says interpretations of findings, and then on page 89 there are a couple of -- well, one in particular, one issue that I would like to ask you about.

Just from the top, the first few paragraphs describe demand management as a maturing concept. But the second bullet point is of particular interest. It starts, the introductory line is:

> Emphasis is rapidly shifting from conservation to load management initiatives largely because... the crisis priority given to conservation as a result of government pressure in the laid 70s and 80s has faded.

Is that is that something that Ontario Hydro agreed with in 1989 and still agrees with today?

A. I think we agreed with that. That's our perception as well of what was going on in the United States.

Q. Is it still Ontario Hydro's view that the crisis priority given to conservation as a result of government pressure in the late 70s and 80s has faded in Ontario in the 1990s?

A. Hardly.

Q. That's my concern, Mr. Wilson?

A. Nor is it valid any longer in the U.S.

THE CHAIRMAN: I thought you said it did, you agreed with it, and now you said it doesn't.

MR. WILSON: In 1989, I think that was a fair characterization. In 1991, I don't believe it is.

THE CHAIRMAN: I see, okay.

MR. ROSENBERG: Q. Given the two points that we have raised, one which is apparently a fundamental error in characterizing Ontario Hydro's load shape objectives and this comment about conservation issues, what value, if any, does Ontario Hydro attach to this comprehensive review which is Exhibit 24?

MR. WILSON: A. Well, you have got a couple of questions there.

I think I stated that on page 11, I believe - is it page 11? - yes, page 11, that the consultant's report is in error in terms of load shape objectives.

I would refer to you page 34 where the consultant outlines Ontario Hydro's energy management targets, and they clearly don't have any problems with getting it right on this page. They listed electrical efficiency improvement as No. 1, load shifting No. 2 and capacity load is No. 3, then they have the data in pretty good order. So, I don't think if there was an error in the one table it really invalidates the report.

To the second part of your question, you are asking what importance or meaning we attach to this comprehensive report. The report served its purpose. It told us that in the summer of 1989, American utilities in large measure, many of them had no targets at all for the year 2000. Lots of them had targets for the year 1995. There is no consistent way of comparing budgets across electric utilities.

But to the extent that targets could be compared in 1995, we were not expected to be moving as quickly, or have gone as far, I should say, as many of the leading U.S. utilities and considering we were at start-up point in the summer of 1989, in fact the Demand/Supply Plan had not yet been issued, but by the year 2000 we would be at the top of the group.

In earlier testimony I said that it is my judgment that we are no longer right in the top of the group because the situation is changing very quickly.

Q. What effect do you believe that assumption, that false assumption based on the chart on page 11, would have on the conclusions of this report? What weight or materiality do you place on the error identified on page 11 respecting the usefulness of this report?

A. None.

Q. None. And why is that, Mr. Wilson?

A. The report met our needs. We think the advice was sound.

Q. Now, was one of the roles of the independent reviewer to assess -- I am just looking at project objectives here on page 2. The first bullet point says:

> Providing an independent review and analysis of Ontario Hydro's demand management targets relative to those of other North American utilities.

And the second bullet point is:

> To establish benchmarks against which Ontario Hydro's demand management targets can be both quantitatively and qualitatively compared to utility industry standards and norms in DM planning, management and implementation.

Now, given those broad overviews, isn't it important to understand what Ontario Hydro's objectives are and to get it right when you are doing your analysis because what you are really doing here is a relative analysis, determining what Ontario Hydro says it wants to do, versus what they are planning to do?

A. Well, as I say, I attach no particular importance to a couple of digits on one page in a report which basically gave us information we found valuable.

Q. Is it your position, Mr. Wilson, that when the consultant prepared this report, the fact that they missed the No. 1 demand management objective of Ontario Hydro will have no bearing on the conclusions of this report?

A. I will say it again. I think they made a mistake. I think if we had them here today, they would say, oops, that's not what I meant to do.

It may be a typographical error. I think the rest of the report is consistent and communicates a very clear understanding of what we are doing.

I think you found three key strokes that dispute that fact.

[4:26 p.m.]

Q. My interpretation of this report is that it focuses on demand management but does not focus -- in fact, specifically determines that conservation is not an objective of Ontario Hydro, nor is a strategic load reduction, and, in fact, points to other demand management objectives as Ontario Hydro's key priority.

I know this is not the place to argue it. I have put the proposition to you, and you have given a fair response, but I would like to understand, Mr. Wilson, how you can say it's irrelevant.

You have given me a conclusion, and I don't understand the reasoning behind your conclusion, how you can say that missing demand management objective number one, which is load reduction, is not important because when I read pages 88 through about page -- well, certainly page 90, it appears to me that the consultants specifically reject conservation and strategic load reduction as an option.

MR. B. CAMPBELL: Well, Mr. Chairman, hasn't Mr. Wilson already answered this question?

He's pointed to some particular pages wherein the consultant in his judgment showed a clear understanding of Ontario Hydro's program, and he's given his opinion that taken as a whole the report clearly gave Ontario Hydro the information it requested in relation to the questions that were asked. I believe he has answered this question.

THE CHAIRMAN: Perhaps Mr. Rosenberg's reading of the report is quite different.

If Mr. Rosenberg wants to establish that point by referring to specific passages, then he will

have to do it if Mr. Wilson feels that the report does in fact recognize load reduction as a primary objective.

Whether the report does or not doesn't seem to be of terribly great importance. It's what they have done and what they are doing that seems to be important, but if this is significant and Mr. Wilson takes that position, then I think Mr. Rosenberg is free to point out various parts of the report that are inconsistent with that conclusion - if he wants to. (laughter)

MR. ROSENBERG: The ball's in my court.

I think you have phrased my point very well, Mr. Chairman. I don't want to argue with Mr. Wilson. I have put my point; I have heard his conclusions. I would like -- if I am wrong, I would like him to point out where in the report I am wrong and then I will move on. I realize --

MR. B. CAMPBELL: If he's going to do that --

THE CHAIRMAN: Wait a minute. Wait a minute.

He's done that by pointing to page -- I just forget the number now, page 34, which lists in very graphic terms the objectives of Ontario Hydro and

puts electrical efficiency improvements at the top of the list. Whatever significance that may have, I don't know. I haven't read the report.

MR. WILSON: Mr. Rosenberg, perhaps just one other place you might look is on page 45. You see that our consultant has a graph here which compares the targets of the various utilities that had targets for the year 2000 and has a stacked graph for each one with "conservation" on the bottom, which is -- one can read "strategic conservation" - the word "strategic" is missing here - and "load management", by which we can read "load shifting".

I don't know what meaning to attach to the fact that they put the "conservation" on the bottom and the "load shifting" on the top, but they clearly saw fit to report page after page after page here on conservation and not on peak and load shifting.

Conservation was the essence of what -- load shifting and conservation were the essence of what they reported to us, and that met our needs because that's exactly what we wanted.

MR. ROSENBERG: Q. Now, you have stated that this is the only comprehensive review of the demand management activities of Ontario Hydro, and there are other very important sectoral analyses that

we can turn to.

Does Ontario Hydro currently have underway a new comprehensive analysis of its demand management activities that will be available for this demand/supply hearing?

MR. WILSON: A. An analysis of our -- can you repeat your question, please? I will try and understand it.

Q. Yes, I can.

A. We are constantly analyzing our conservation demand management program so that --

Q. I understand. You told me that this was the only report that -- and I am paraphrasing here. I didn't take note of the exact words.

But this is the only independent report that critically analyses Ontario Hydro's entire demand management plan, and it was done in July of '89.

Ontario Hydro has been filing documents throughout the course of the hearing. Is there any study currently underway by Ontario Hydro which updates this Exhibit 24 or supersedes Exhibit 24 in terms of a comprehensive analysis?

THE CHAIRMAN: Are you asking for an independent outside consultant's report or are you talking about internal Hydro?

MR. ROSENBERG: Outside, independent consultant's report.

MR. WILSON: Yes, there is.

MR. ROSENBERG: Q. When might that be available for this hearing?

MR. WILSON: A. Well, I would expect that will be another month or so before we have a report that we can complete our review of and release.

Q. Very good. The only other question is: Is there a name attached to the report so that we can as an Intervenor look for its release?

A. I don't know what the report might be called when it's released.

Q. Because one of our concerns is we won't be actively participating in about the next four or five Panels.

THE CHAIRMAN: Do you know the name of the consultants?

MR. WILSON: Yes, I do. The consultant is Barakat & Chamberlin.

DR. CONNELL: Do you think they are going to mention strategic load reduction, Mr. Wilson? (laughter)

MR. WILSON: There is a limit to how much control you can have over an independent consultant.

MR. ROSENBERG: Q. I am going to move on to a new topic. I am just going to make sure I pick one that I know I can finish this afternoon.

I would like to ask some questions about time-of-use rates, existing time-of-use rates. Mr. Harper?

MR. HARPER: A. Yes.

Q. As I understand it, the existing time-of-use rates are said to have two primary purposes, Mr. Harper. One is to track costs and the other is to promote shifting of load from peak to off-peak periods.

A. That's a fair representation, yes.

Q. And would it also be fair to say that time-of-use rates are a primary tool utilized to promote load shifting?

A. Yes.

Q. And in terms of the commercial and industrial sectors, the other demand management tools are incentive programs which offer grants and loans for investments in load shifting equipment, such as thermal cooling technology; is that correct?

A. I believe as well as the time-of-use rates we have, as you indicated, programs in the commercial area for thermal cooled storage, a

program -- I believe the name is load shifting for industry, which is an incentive program to encourage industry to invest in storage and other types of facilities that would enable them to more take advantage of time-of-use rates, and I believe there is a third program which is focused specifically at off-peak charging of electrical forklift trucks.

Q. Now, as I understand the programs, in order to be eligible for the grants, the customer must prove that the approved equipment will be installed and that at least 100 kilowatts is shifted from peak to off-peak for a three-year period.

Is that your understanding, Mr. Harper?

A. I think we have reached the point where it's probably best to get the Program people to respond to the question.

MS. FRASER: A. The minimum is true for the -- in terms of, like, kilowatt size. It's true for the industrial load shifting plan. The three-year operations is common to both the commercial and industrial.

However, in the fact that thermal storage tends to be an option for large commercial buildings we tend to find that they are larger than that size anyway, although we are looking at small packaging

thermal cooled storage.

What we also find with thermal cooled storage is that it tends to also save energy as well as shift it.

Q. And generally, Ms. Fraser, I also understand that Hydro monitors these programs directly to determine that there actually has been a shift in load as a result of giving the incentive?

A. Yes, that's correct.

Q. Now, I also read from the transcript, from in fact Exhibit 260, page 3 that we have just looked at, that Ontario Hydro's direct evidence is that it has no programs to achieve load building or valley filling; is that correct?

A. That's correct.

Q. Now, this is where I have...not a problem, but maybe you can help us reconcile this issue, because isn't it also true that in the recent past time-of-use rates of the kind now in place were seen as a mechanism for load building; that is, for getting customers with surplus production capacity to use more energy in the off-peak periods?

MR. HARPER: A. Yes, I think prior to the introduction of time-of-use rates in 1989 there were off-peak rate programs both for our direct

industrial customers, also for large rural retail customers, and in a limited extent some of the municipal utilities.

What these programs were aimed at doing was for customers who could restrict any load increments strictly to the off-peak period, so that you would have one contract or maximum level for your peak period and any incremental demand will only be added in the off-peak period. You were given a lower rate for that incremental demand.

Essentially, to a large extent you weren't penalized by having a demand charge applied to that off-peak load.

Q. So we are in ancient times, before the demand/supply plan came out. You used these time-of-use rates to build load, but now we are in a hearing discussing them as a load reduction mechanism. And I would like your views, Mr. Harper, on the difference --

THE CHAIRMAN: I don't see any difference, but I don't think they are using it as a load reduction; they are using it, as I understand it, for load shifting.

MR. ROSENBERG: Q. Well, let me ask these questions, then.

The only difference of substance with the earlier rates was that the customer had to demonstrate that it was building its load in order to qualify; isn't that correct, Mr. Harper?

MR. HARPER: A. For those rates, no.

Q. So how did they qualify if there is no measurement by Ontario Hydro?

A. Well, what those rates did - maybe to look at the rates applied to our direct industrial customers - was that those customers have a maximum contract demand which they are typically not allowed to exceed at any point in time.

What we did is allow customers to exceed that contract demand only in the off-peak period, and in doing so there was the same energy rate and typically a much lower demand charge. But the standard rates applied within the peak period.

I don't know whether the easiest way to characterize the difference between then and now is we had a set of standard rates that we applied to all customers.

[4:40 p.m.]

We had, I guess you could call them, off-peak discounts, if you want to call them that for that period of time. Right now we have introduced time

of use rates for all these industrial customers, which essentially increases the rates in the peak -- we have this higher standard rate now in the peak period and a lower rate in the off-peak period.

Q. Is there -- what is the --

A. I guess I'm not too sure if I'd characterize it as -- as load building per se. I think it was a recognition to a large extent that those off-peak periods even then were a fairly inexpensive time for to us supply power to those customers.

It's just we hadn't gotten to a point of having a comprehensive time-of-use rate system in place within the province, and this was one mechanism for in part recognizing those lower off-peak supply costs to customers, albeit not as sophisticated a way as we are doing now with time-of-use rates.

Q. How is Ontario Hydro sure that its current time-of-use rates are not actually providing an off-peak load-building or valley-filling mechanism, and thus contributing to overall increase in energy use, which would be contrary to its strategic objective of load reduction?

A. I guess, to be honest, we can't be 100 per cent sure. You know, I guess we go back to Ms. Fraser's traditional sodium pentathol test of

customers. You offer a higher rate in the peak period, a lower rate in the off-peak period essentially to track the cost differences between those periods.

There is probably a number of affects that will rise out of that. The major one, I would suggest, is load shifting in the sense that if customers are trying to get a certain job done, and they don't perceive it cheaper to do that job in the off-peak periods, they will shift their usage to off-peak periods.

It may well have somewhat of a conservation effect within the peak period itself. The customers are facing higher prices. If they can't shift, they may react to those higher prices.

Also, there could well be an element of seeing the lower price in the off-peak period and reacting to that. I don't think we can be 100 per cent certain.

Q. Is there some mechanism that you could put in place to check whether in fact load shifting is contributing to an overall increase in energy use? And that is track this problem to determine what in fact is happening in the marketplace?

A. I think on an individual customer basis, in terms of what that customer is doing at a

particular point in time, no.

I think in terms of tracking and monitoring the effects of time-of-use rates, yes. And we have certain work underway right now which will give us some insight into that.

One of the initiatives is doing some fairly detailed econometric modeling of the use of electricity in specific industries and how they react to time-of-use rates, which I think will give us some indication as to whether or not, you know, it is just load shifting or something else is occurring.

Or on a much more simplistic basis, using billing data analysis to try and monitor the change, the use of pattern, usage pattern of industrial customers, say from '87 and '88 when there weren't any time-of-use rates, through '89 and '90 when we now have time-of-use rates. The problem with just using billing data is there is so many other factors, changes in economic conditions or whatever else that muddy the waters. So we think this more detailed analysis will assist us in giving us more insight into this.

Q. Mr. Harper, that is the conclusion that advisors to the CAC have come to. That there is no current way to track it. Could you help us by putting it into a context?

If we don't know what the net effect of Ontario Hydro's time-of-use rates are in terms of load reduction or load increase, can you help me by telling me the magnitude of the problem?

A. Well, I'm sorry, when you say the magnitude of the problem --

Q. Putting it into the context of the total load of Ontario Hydro. How far off could you be, if in fact time-of-use rates are building load rather than reducing load? How much load do you think could be added, because of these time-of-use rates?

A. I really don't know. I think the important thing to recognize is the point we started off on this, which is that if we are building load, and if we are, and I take that as a hypothetical, it's essentially in the off-peak periods, which is to some extent sort of less significance and less importance than building load in the peak period, particularly if we are looking at sort of the demand supply relationships on the system and having to figure out what I'm going to add due to capacity to the system.

MS. FRASER: A. I'd also point --

THE CHAIRMAN: Mr. Harper, I should know the answer to this, but who gets time-of-use rates?

MR. HARPER: Right now it is all of the

direct industrial customers in the province that we serve. There is a little over 100 of them; their customers in excess of five megawatts; also, all of the similar customers served by municipal utilities, there is probably about 150, 160 of them, customers over five megawatts get time-of-use rates.

THE CHAIRMAN: Do they get it automatically, or do they have to ask for it?

MR. HARPER: They get it on a mandatory basis.

THE CHAIRMAN: So everyone gets it whether they want it or not?

MR. HARPER: Yes.

THE CHAIRMAN: Okay.

MR. HARPER: Also, for a limited number of municipal utilities in our rural system have started to extend time-of-use rates down to customers below five megawatts. So there is about 34 or 35 utilities which include us who have started to apply it to customer below 5 megawatts.

MS. FRASER: I'd just like to point out, in terms of delivering our program, both the information about time-of-use rates, the load shifting incentives and the energy efficiency improvement programs to these large customers that are currently

under time-of-use rates, we don't say, "Oh, customer A is only going to be use time-of-use rates, customer B we will do energy efficiency with."

We are providing a one-stop shopping, if you will, for the whole ball of wax with those customers, and we are helping them make the best use of electricity in their facilities, recognizing the price signal that time-of-use rates gives in terms of moving load off of our 16-hour peak, otherwise known as the terminal plateau, and saving energy.

Many, I would say, many projects that save energy, let's take a three-shift operation, lights are on three shifts, if be put in a more efficient lighting system, it saves lighting for 24 hours a day. When we credit that to our monitoring system, we are only crediting for the 16 hours.

So in actual fact, even though we have saved it for 24 hours, we are not adding that in. And to the extent to which some of that additional saving may end up being displaced, if you will, by load shifting, I think in total when we end up looking at customers overall, load profiles, if we could net out impacts in terms of increased production because of improved competitiveness and so on and so forth, which will also result from conservation, the fact that we

make -- help make Ontario industry more competitive through the use of electricity could increase the actual output, the demand for the product and so on, and therefore increase the industrial base of the province. That could also happen. We don't deny that.

But I think what is important to realize is that we are providing that total package of service to help reduce and shape the demand in the customer's premises, such that it is managed to match our needs and the needs of the system.

MR. HARPER: If I could maybe just add one more piece, I recalled while Ms. Fraser was speaking an interrogatory response we gave, 4.20.44, which included the results of our first year billing analysis. And as I indicated, this is not a really -- really the best way of trying to get at it, but it is a first cut at trying to get at what you think is a shift out of the peak period into the off-peak period.

The conclusions in that on page 17 were that -- and this is for the groups of customers that we had metering data for, there appeared be about a 31 megawatt shift from the peak period, 24 megawatts into the off-peak period. So at least within the context of that analysis, it appears that we aren't getting more of an increase in the off-peak period than we are

getting a reduction in the peak period.

MR. ROSENBERG: Q. If you could just run those numbers by me again, so I understand them. You are talking about certain megawatts, and I was looking for the relative -- not even relative, a target or a proxy for the problem that could exist. Is it the 54, or 34?

MR. HARPER: A. No, I realize this was more sort of a response to the first part of the discussion we were having as opposed to your final question. I think it is still fair in terms of the type of sensitivity involved. Like I said, I really don't know.

I was trying to provide some information here on the first part of the discussion we were having. And that is, do you think you are going to get more of an increase in the off-peak than you do a decrease in the peak period. And the results of the analysis of the billing data that we have for the first year seem to suggest that that is not the case.

Q. Going back to my question, which is this, if in fact time-of-use rates are directionally increasing load, do you have any idea or any estimate of the amount of load that could be added to Ontario Hydro's load as a result of time-of-use rates, or is it

just too early to tell, because you don't have the data?

A. I think it is too early to tell.

Q. One other issue related --

THE CHAIRMAN: 4.20.44 should be the next 261 number.

THE REGISTRAR: 261.72, Mr. Chairman.

---EXHIBIT NO. 261.72: Interrogatory No. 4.20.44.

THE CHAIRMAN: Sorry, Mr. Rosenberg, go ahead.

MR. ROSENBERG: Q. In terms of, Mr. Harper, one other concept I'd like to put into the mix here, we have talked about time-of-use rates and load building versus load reduction, one other way to look at this is look at building energy use.

Now by shifting load from the peak, the more expensive time period to the less expensive time period, you could be encouraging companies to build their energy use. And what I'd like to know is whether by increasing energy use in the off-peak hours, you could in fact contribute to peak load?

MR. HARPER: A. I think -- say if you are increasing your load in the peak period -- excuse me, in the off-peak period by more than what the reduction is in the peak period, more or less there is

a net gain in energy. I think that was the point you were starting with--

Q. Yes.

A. --what that would do to some extent, if that was occurring, was reduce the overall target you would have available for load shifting, and the thousand megawatts was predicated on a view of what the difference was between the peak and the off-peak loads. If that particular situation is occurring, it could have some implications for the thousand.

I think if you remember the earlier discussion Mr. Shalaby was having in terms of talking about going from 1200 to 1000 in terms of using the 1000 as a target instead of a straight 1200, to difference, I think there is some buffer in there which gives some room to keep the thousand in place, even if a bit of that occurs.

Again, actually in essence, when we were talking earlier about building load, I thought you were talking about total energy. Because as I said, in my view the time-of-use rates, you will see a reduction in the peak periods. So to some extent what you would really only see, if anything, is an increase in total energy, and I think it is really too early to tell right now.

Q. What will you have to do to know the answer to that question, and when would you expect to have some indication as to what the answer is? Is it a matter of months or years?

A. I think it is more a matter of years, honestly. I think what you'd have to do is accumulate sufficient data and experience of looking at customers, when they are on time-of-use rates, in order to be able to compare that behaviour and those usage patterns with previous data you had prior to them going on time-of-use rates.

I think the other thing is is that the overall response to time-of-use rates, as we have seen in Exhibit 76, is something we postulate will occur over time. So that even if we could do a definitive analysis say for 1989, that would only be for that part of the load shifting that had occurred in 1989. We expect more load shifting to occur in '90, '91, '92.

So I think there is two elements to it: 1) Time to gather the data, and 2) time to have more customers actually react to the rates and shift their load.

Q. And if in fact you found that time-of-use rates were building load, building energy use, and impacting on peak load, what would you do to

solve that problem?

A. I guess, like I said, I think you would have to go a long ways before they would impact on peak load, given the difference between the peak and the valley that we have talked about. And you'd have to weigh off what's that impact against what is the benefit you have clearly gotten from the load shifting aspect that you have received. At this point in time, I don't know what we would do.

[4:55 p.m.]

THE CHAIRMAN: This assumes, I suppose, that there is some room for the customers who are using the time-of-use rates to want to use more electricity; is that right?

MR. HARPER: Yes. I would assume that's why with the load shifting what you are assuming is that they have got the same job they want to do, they just decide they are going to do it at a different point in time. If there is more energy used in total, you would assume they were doing different additional jobs, or maybe Ms. Fraser is providing additional jobs.

DR. CONNELL: I suppose it is possible these people are staying up late working on new electrical efficiency technology. (Laughter)

MS. FRASER: We wouldn't mind getting a

compact fluorescent plant working around the clock in Ontario.

MR. ROSENBERG: Q. Just a couple more questions.

What would you do, Mr. Harper, if you found that it was only building energy use? It wasn't affecting the peak but in fact time-of-use rates were increasing the load, not reducing the overall load, which is your No. 1 objective, what would Ontario Hydro do in response to that data?

MR. HARPER: A. One, I think that's a fairly abstract hypothetical, given the evidence to date we have seen in terms of customers are shifting their load and moving out of the peak period to the off-peak period.

Q. But the question relates simply to the load reduction issue, not to the peak. Factor out the peak now. Just look at your time of use rates, and if the data shows that in fact what time-of-use-rates are doing is increasing the load rather than reducing the load, what response would the demand management team of Ontario Hydro have to that situation?

A. I presume you are saying they are increasing load and that increase is being observed in the off-peak period?

Q. Correct.

A. And we are still seeing reductions in the peak period load?

Q. What you are seeing is increase in total energy.

A. But that increase in total energy, to put it my words, is being achieved by the fact that there are reductions in peak period demand that are being more than offset by increases in energy in the off-peak period?

Q. Yes.

A. I think we would still view that on net as being an economically acceptable alternative to having to build supply. I would suspect it would pass the total customer cost test.

Q. And just one more question then I will finish.

Would it be socially acceptable?

A. Socially acceptable has a number of elements to it. If by socially acceptable you were including perhaps the jobs you did from the additional production, somebody might say yes. If your view of socially acceptable was including what were viewed as being some of the environmental impacts from additional energy use, somebody might say no. So, I think there

are a whole wide range of social aspects of it you would have to consider.

Q. Looking at Exhibit 260, No. 3, which we have looked at earlier today, would it be in keeping with your No. 1 -- or one of your first priorities which is load reduction, which is your first demand management objective?

A. I think to the extent that the primary focus of that load reduction is load reduction in the 16 hour winter peak, yes, I think to that extent there would be some consistency between the two.

Q. And what if your concern was the entire load over the entire year?

A. If you were just looking at total gigawatthours, regardless of time produced, regardless of cost to produce, then no, there would be an inconsistency.

MR. ROSENBERG: Those are all my questions.

THE CHAIRMAN: We will adjourn until ten o'clock on Monday, September the 30th when we will continue with this cross-examination.

THE REGISTRAR: The hearing will adjourn until Monday morning, September 30th, at ten o'clock.

---Whereupon the hearing was adjourned at 5:02 p.m., to be reconvened on Monday, September 30, 1991, at 10:00 a.m.

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